ATTACHMENT 54

UNITED STATES DISTRICT COURT
NORTHERN DISTRICT OF CALIFORNIA

HIGHLY CONFIDENTIAL: SUBJECT TO PROTECTIVE ORDER

SURGICAL INSTRUMENT SERVICE COMPANY, INC., Plaintiff, vs. INTUITIVE SURGICAL, INC., Defendant.	Case No. 5:21-cv-03496.

EXPERT REPORT

Dr. Russell L. Lamb
President
Monument Economics Group, LLC
1000 Wilson Boulevard
Suite 2650
Arlington, VA 22209

December 2, 2022

TABLE OF CONTENTS

I. Introduction and Summary of Conclusions

A. Expert Background and Qualifications

1. I am the President and co-founder of Monument Economics Group ("Monument"), an economic consulting firm based in Arlington, VA. Monument provides economic research and quantitative and statistical analyses to clients in the United States, Canada, and elsewhere internationally. I have studied the economics of markets and prices and have consulted on these issues for over 30 years. I have previously been asked to opine on a variety of economic issues, including the existence of monopolization or cartel behavior in various markets, damages arising from anti-competitive conduct, and class-wide impact arising from alleged price-fixing and anticompetitive conduct as well as class-wide injury arising from allegations of consumer fraud or breach of warranty. A copy of my curriculum vitae, including a list of the matters in which I have submitted expert testimony in the past four years, is attached to this report as Appendix A.

2. I graduated from the University of Tennessee, Knoxville in 1987 (*summa cum laude*, Phi Beta Kappa) as the top graduate in my class in the College of Arts and Sciences. I earned a Master's degree in economics from the University of Maryland in 1989. I received the Doctor of Philosophy degree in economics from the University of Pennsylvania in 1994. My economic research has been published in peer-reviewed journals such as the *Journal of Econometrics*, *Journal of Development Economics*, *CATO Journal*, *Regulation*, and others. I have also served as a referee for leading economics journals, including the *International Economic Review*, *Journal of Business and Economic Statistics*, *Journal of Labor Economics*, *American Journal of Agricultural Economics*, and *Contemporary Economic Policy*.

3. Prior to co-founding Monument, I held a variety of positions in government, academia, and other consulting firms. From 1994 until 1999, I was an Economist (later Senior Economist) with the Federal Reserve System of the United States in Washington, DC and Kansas City, Missouri. From 1999 until 2004, I taught economics and agricultural economics at North Carolina State University in Raleigh, North Carolina. I have also been hired as an economic consultant to the World Bank and the Government

of Peru, in addition to being retained on a wide range of economic consulting projects in a variety of contexts. Courts in the United States and Canada have accepted my economic analyses of the market as evidence in litigation involving allegations of anticompetitive conduct in a number of cases including, for example, *In re: Domestic Drywall Antitrust Litigation, Fond Du Lac Bumper Exchange Inc., et al. v. Jui Li Enterprise Company Ltd. et al., In re: Puerto Rican Cabotage Antitrust Litigation, In re: Aftermarket Auto Lighting Products Antitrust Litigation, In re: Titanium Dioxide Antitrust Litigation, Eugene Allan, et al.* In addition to my consulting activities, I most recently have taught economics at the University of Tennessee, Knoxville, where I am an adjunct faculty member in the Department of Economics in the Haslam College of Business. The hourly rate for my work in this matter is $750 per hour. Monument's compensation in this matter is not contingent upon the content of my testimony or the outcome of this litigation.

B. Summary of Plaintiffs' Allegations

4. I understand that a Complaint was filed on May 10, 2021 by Surgical Instrument Service Company, Inc. ("SIS" or "Plaintiff") against Intuitive Surgical, Inc. ("Intuitive" or "Defendant").[1] I understand from Counsel for the Plaintiff that Plaintiff's allegations in this matter relate to Intuitive's dominance of the market for minimally invasive soft tissue surgical robots ("MIST Surgical Robots") with its da Vinci surgical robots, and that, through exclusionary and anticompetitive conduct, Intuitive uses this dominance to maintain its monopoly in a separate market: the market for replacements and repairs of EndoWrists, which are surgical instruments (e.g., graspers, forceps, scissors, etc.) that are used during the da Vinci robotic surgeries ("EndoWrist Repair and Replacement Market"). I further understand Plaintiff alleges that "Intuitive has gone to extraordinary efforts to leverage its monopoly power in robots for use in minimally invasive soft tissue surgery, the repair and support of those robotic systems, and its monopoly power in instruments for use with such robots to foreclose aftermarket repair of those instruments by any competitors. This costs hospitals and patients at least 30-45% per instrument

[1] United States District Court Northern District of California, *Surgical Instrument Service Company, Inc., Plaintiff, v. Intuitive Surgical, Inc., Defendant,* Case No.: 5:21-cv-03496, Complaint, May 10, 2021 (hereafter "Complaint").

(which savings would increase over time) or hundreds of millions of dollars a year in a $2.4 billion market, without any safety or technical justification."[2] I further understand Plaintiff alleges that an "effect of Intuitive's anticompetitive conduct is to generate and sustain unreasonably high, supra-competitive prices for aftermarket EndoWrist instruments" (the "Alleged Misconduct").[3]

5. In particular, I understand Defendant's alleged anticompetitive conduct to "foreclose aftermarket repair of those [EndoWrist] instruments by any competitors" includes the following:

- Intuitive's standard sales and service agreement for its da Vinci surgical robots "demands that customers further agree to a limited license for the use of EndoWrist instruments," which "expires once an EndoWrist instrument is used up to its maximum number of uses as specified in the documentation accompanying the particular instrument,"[4] and "prohibits customers from engaging any unauthorized third party to repair, refurbish, or recondition EndoWrist instruments, whether before or after the limited use license has expired."[5]
- "Between late 2019 to early 2020, Intuitive sent letters to and had in-person conversations with SIS's customers or potential customers, knowing that they were under contract or in contractual negotiations for repaired EndoWrists. As a result of the threats and misleading statements in those letters and conversations,

[2] Complaint at ¶28. I further understand Plaintiff alleges that "[w]hen Intuitive discovered that its customers were using SIS's services, it immediately leveraged its anti-competitive agreements and monopoly power to crush this threat to its supra-competitive EndoWrist profitability." See Complaint at ¶6.
[3] Complaint at ¶24. "Intuitive leverages its market power in the worldwide and domestic markets for the sale of surgical robots used in minimally invasive soft tissue surgery, and the market for repair services for their robots, to pressure its customers to use supra-competitively priced replacement EndoWrist parts." See Complaint at ¶65.
[4] Complaint at ¶4. I understand Plaintiff alleges that "EndoWrists also include an internal memory chip" which "counts the number of times the EndoWrist is attached to a da Vinci robot arm, not an actual measure of usage such as usage time, number of movements, or actuation time." See Complaint at ¶¶30-31. Further, I understand that Plaintiff alleges that the "da Vinci robot system queries the memory chip prior to performing any operations with the particular EndoWrist instrument. After a certain number of uses, usually limited to ten, the EndoWrist instrument is rendered non-operational, based solely on the number of times it is attached to a da Vinci robot arm, without any regard to the actual underlying physical condition of the EndoWrist instrument. Without the services of providers such as SIS, the hospital has no choice but to buy a brand-new replacement EndoWrist instrument from Intuitive at full price." See Complaint at ¶32.
[5] Complaint at ¶4.

all of SIS's EndoWrists customers backed out of their contracts or did not sign contracts under negotiation, effectively eviscerating SIS's EndoWrist repair business."[6]

6. I understand from Counsel for the Plaintiff that the relevant period for my analysis is the date SIS entered into contracts and was in discussion for other contracts to provide EndoWrist repair services to numerous hospitals, health care systems, and GPOs in 2019 and 2020, through the present ("Relevant Period").[7]

C. Assignment

7. I have been asked by Counsel for Plaintiff to analyze the following questions:

a. The relevant antitrust product and geographic markets within which the existence of Intuitive's monopoly power and the likelihood of success of the Alleged Misconduct may be assessed;

b. Whether economic analysis and evidence establishes that Intuitive possessed monopoly power in these relevant antitrust markets; and

c. Whether economic analysis and evidence establishes that Intuitive's conduct with respect to the Alleged Misconduct was anticompetitive and resulted in harm to competition.

I discuss my analysis of these questions below.

[6] Complaint at ¶92. "Intuitive's letters make its threats explicit—if the hospital uses repaired instruments, Intuitive will render its surgical robot inoperable. Not only will Intuitive seek damages or indemnity from its customer, but if Intuitive discovers 'Systems being used with instruments by an unauthorized third party, Intuitive may no longer accept your service calls for such Systems.' Because Intuitive also refuses to allow any competition in the market for service of its robots, and refuses to make error codes and other critical information available to third parties, failure to provide such service will render a robot that originally cost well over a million dollars inoperable. Many hospitals have multiple such robots that would thus be rendered inoperable. [...] Again, the threat is explicit—if the hospital uses refurbished instruments, Intuitive will render its surgical robot inoperable." See Complaint at ¶¶102-103. Further, in "private conversations, Intuitive representatives have made this threat even more explicit. In response to one hospital's use of third-party repair services, an Intuitive representative stated that Intuitive would turn the surgical robot into a 'paperweight.'" See Complaint at ¶104.

[7] Complaint at ¶5.

D. Materials Reviewed

8. In performing my analyses, I have undertaken economic research and analysis based on publicly available documents, as well as materials produced as part of this litigation, in order to understand the U.S. market for minimally invasive soft tissue surgical robots and the market for the repair and replacement of EndoWrist surgical instruments in the U.S., as well as the prices paid for these products. I have also reviewed documents produced by the parties in this matter, trade press, and academic literature. A complete list of the materials I have relied upon in forming my opinions is contained in Appendix B.

E. Summary of Conclusions

9. Based on my analyses and research into the U.S. market for MIST Surgical Robots and EndoWrist Repair and Replacement Market, as well as my training and experience in economics, I have reached the following conclusions:

a. The market for MIST Surgical Robots constitutes a relevant antitrust product market. Further, the United States constitutes the relevant antitrust geographic market with respect to the tying market for evaluating the Alleged Misconduct.

b. The EndoWrist Repair and Replacement Market constitutes a relevant antitrust product market. Further the United States constitutes the relevant antitrust geographic market with respect to the tied market for evaluating the Alleged Misconduct.

c. Intuitive possessed monopoly power in the U.S. market for MIST Surgical Robots during the Relevant Period. Further, Intuitive possessed monopoly power in the EndoWrist Repair and Replacement Market in the U.S. during the Relevant Period and used its monopoly power in the market for MIST Surgical Robots to maintain its monopoly in the EndoWrist Repair and Replacement Market in the U.S. during the Relevant Period.

d. Intuitive's Alleged Misconduct was anticompetitive and resulted in harm to competition in that hospitals had little choice but to pay higher prices for replacement EndoWrist surgical instruments from Intuitive in order to use their da Vinci surgical robots than they otherwise would have had they been able to repair their EndoWrist surgical instruments through third-party repair companies such as SIS.

II. Industry Background

A. Methods of Surgery

10. In health care practice, there are two primary methods of surgery: open surgery and minimally invasive surgery.[8] Open surgery refers to a procedure that involves "the cutting of skin and tissues so that the surgeon has a full view of the structures or organs involved."[9] Each physical step in such a procedure "is accomplished by natural, intuitive hand movements used to accomplish tasks such as dissection, ligating, and suturing."[10] One example of open surgery is the removal of organs, such as the gallbladder or kidneys.[11]

11. The other primary method of surgery is minimally invasive surgery, which refers to "any technique involved in surgery that does not require a large incision."[12] Minimally invasive surgery is a method of surgery that "allows the patient to recuperate faster with less pain."[13] Many surgical techniques today fall under minimally invasive surgery, which "can be used to evaluate illnesses and injuries, as well as to obtain tissue samples

[8] Stanford Health Care, "General Surgery Types" (hereafter "Stanford Health Care"). Available at: https://stanfordhealthcare.org/medical-treatments/g/general-surgery/types.html.
[9] Stanford Health Care. See, also, John Hopkins Medicine, "Methods of Surgery," (hereafter "John Hopkins Medicine"). Available at: https://www.hopkinsmedicine.org/health/treatment-tests-and-therapies/methods-of-surgery.
[10] Intuitive-00595673-694 at 677.
[11] Stanford Health Care.
[12] Stanford Health Care.
[13] Johns Hopkins Medicine. See, also, Stanford Health Care.

and make repairs."[14] One minimally invasive surgical technique is laparoscopy, which was first popularized in the United States in the 1930s.[15]

12. Unlike traditional open surgery, laparoscopic surgery (which is sometimes referred to as "keyhole surgery") does not require a large incision for the surgery to be conducted.[16] Rather, during the surgery, "the surgeon makes one or more small incisions in the abdomen."[17] These incisions are then used as an entry point for the surgeon to insert a laparoscope, "a long, thin tube with a high-intensity light and a high-resolution camera at the front," which sends images and video back to a monitor for the surgeon to view.[18] During the procedure, "[c]arbon dioxide gas is passed into the abdominal cavity in order to move the abdominal wall away from the organs and therefore create a larger area in which to work," while also reducing risk of additional tissue or organ damage.[19] Various other instruments, such as scissors, dissecting tools, and graspers, may also be inserted through additional "puncture holes" that are made as the surgery is performed.[20] Today, laparoscopic surgery is most commonly used in gynecology, gastroenterology, and urology.[21] Because laparoscopic surgeries are not as surgically invasive, laparoscopic surgery has a number of benefits over open surgery, causing laparoscopic surgery to be "routinely performed instead of traditional [open] surgery."[22] Compared to the larger incisions associated with open surgery, the small incisions used in laparoscopic

---

[14] Johns Hopkins Medicine.
[15] William E. Kelley, "The Evolution of Laparoscopy and the Revolution in Surgery in the Decade of the 1990s," *Journal of The Society of Laparoscopic & Robotic Surgery*, 2008 (hereafter "Kelley") 351-357 at p. 351.
[16] National Health Service, "Laparoscopy (keyhole surgery)" (hereafter "NHS"). Available at: https://www.nhs.uk/conditions/laparoscopy/. See, also, John Hopkins Medicine.
[17] NHS; Stanford Health Care.
[18] Andrew Gonzalez, M.D., J.D., MPH and Anna Giorgi, "Laparoscopy," Healthline, October 6, 2018. Available at: https://www.healthline.com/health/laparoscopy.
[19] Midlands Clinic, "General Laparoscopic Procedures." Available at: https://midlandsclinic.com/general-laparoscopic-procedures/. See, also, MUSC Health, "Introduction to Laparoscopic Surgery" (hereafter "MUSC Health"). Available at: https://muschealth.org/medical-services/ddc/patients/gi-surgery/laparoscopic-surgery/introduction.
[20] MUSC Health.
[21] NHS.
[22] Johnson Memorial Health, "Recovery Benefits of Laparoscopic Surgery," August 2015 (hereafter "Johnson Memorial Health"). Available at: http://blog.johnsonmemorial.org/recovery-benefits-of-laparoscopic-surgery.

surgery results in less post-operative discomfort, shorter recovery time, less scarring, less bleeding, and reduced risk of infection.[23]

B. Introduction of Robotic Surgery

13. Robotic surgery represents the next step in the evolution of minimally invasive surgeries following the success of laparoscopic surgeries. In 1986, "a team using a modified UNIMATION PUMA 200 programmable industrial robotic arm performed the very first robotic assisted surgery (RAS). [...] Since this first successful use of a robot to assist in a surgical procedure, several RAS systems have been developed, but only few of those systems have been commercialized."[24] "Robotic procedures are rapidly becoming the new standard of care."[25] The "first robotic system for laparoscopic surgery became available in 1994. Aesop (formerly Computer Motion, Santa Barbara, CA) directed the laparoscope following the surgeon's voice command. Zeus, a fully integrated surgical system, became available for investigational use in the United States in 1996."[26] Around the time the Zeus surgical system was launched, "the forerunner to what was eventually to become Intuitive Surgical released the SRI Green Telepresence system, which was later to undergo a radical overhaul before morphing into an early version of the current da Vinci® system."[27] The "ZEUS and da Vinci® systems were effectively unified when Computer Motion and Intuitive Surgical merged in 2003. As a result, further innovations and improvements were centred [sic] on the da Vinci® platform, which has subsequently dominated the world of robotic surgery for almost a decade."[28]

14. There are currently three primary types of robotic systems used in the surgical arena: active systems, semi-active systems, and master-slave systems.[29] Active systems

---

[23] Johnson Memorial Health.
[24] Sally Kathryn Longmore, Ganesh Naik, and Gaetano D. Gargiulo, "Laparoscopic Robotic Surgery: Current Perspective and Future Directions," *Robotics*, Vol. 2, No. 9, 2020 (hereafter "Longmore et al.") at p. 1.
[25] Tim Lane, "A short history of robotic surgery," *Annals of the Royal College of Surgeons of England*, 2018 (hereafter "Lane") at p. 5.
[26] Kelley at p. 355.
[27] Lane at p. 6.
[28] Lane at p. 7. See, also, Zheng Wang, Sicong Liu, Jing Peng, and Michael Zhiqiang Chen, "The Next-Generation Surgical Robots," Intech Open, 2017, 3-21 at p 4.
[29] Lane at p. 5. See, also, Jusuf Jamal, Abdulrahman M. Alshahrani, Jamal M. Arif, Feras M. Almarshad, "Robots in Cancer Surgery: A Boon or Bane," *Journal of Cancer Therapy*, Vol. 11, No. 12, December 2020, 803-823 at pp. 805-806.

"essentially work autonomously (while remaining under the control of the operative surgeon) and undertake pre-programmed tasks."[30] Semi-active systems "allow for a surgeon-driven element to complement the pre-programmed element of these robot systems."[31] Conversely, "master–slave systems (of which the da Vinci® and ZEUS platforms were the forerunners) lack any of the pre-programmed or autonomous elements of other systems."[32] Master-slave systems "are entirely dependent on surgeon activity," whereby surgeon "hand movements are transmitted to laparoscopic surgical instruments, which faithfully reproduce surgeon hand activity – but intracorporeally."[33]

15. Robotic surgery provides a number of benefits to both patients and surgeons as compared to traditional laparoscopic surgeries. For the patient, these benefits include a more precise surgery, significantly less pain, less risk of infection and blood loss, earlier discharge from the hospital, less scarring and shorter recovery, and, in many cases, better clinical outcomes.[34] For the surgeon, these benefits include an enhanced visual field, superior dexterity, and access to hard-to-reach places.[35]

16. According to one developer of robots for minimally invasive surgery, increased adoption has led to "a double-digit annual growth rate over the past five years."[36] One market research report noted that the "rise in demand for minimally invasive technology is driving the robotic surgery devices market."[37] This same market research report noted

[30] Lane at p. 5. Examples of this include the PROBOT and ROBODOC platforms. See Lane at p. 5. See, also, Katherine Levinson, "Robotic Assisted Surgery," Electrical and Computer Engineering Design Handbook, 2015.
[31] Lane at p. 5.
[32] Lane at pp. 5-6.
[33] Lane at p. 6.
[34] MedStar Health, "Robotic Surgery" (hereafter "MedStar Health"). Available at: https://www.medstarhealth.org/services/robotic-surgery.
[35] MedStar Health.
[36] Rob Surgical, "Top 5 Trends in the Robotic Surgery Market." Available at: https://www.robsurgical.com/market-trends/.
[37] The Business Research Company, "Robotic Surgery Devices Global Market Report 2022 – By Product And Service (Robotic Systems, Instruments & Accessories, Services), By Surgery Type (Urological Surgery, Gynecological Surgery, Orthopedic Surgery, Neurosurgery, Other Surgery Types), By End User (Hospitals, Ambulatory Surgery Centers) – Market Size, Trends, And Global Forecast 2022-2026," October 2022 (hereafter "Business Research Company"). Available at: https://www.thebusinessresearchcompany.com/report/robotic-surgery-devices-global-market-report.

that the "global robotic surgery devices market grew from $5.21 billion in 2021 to $6 billion in 2022 at a compound annual growth rate (CAGR) of 15.2%."[38]

C. Intuitive's Da Vinci Surgical Robot

17. In 1995, Intuitive was founded by Dr. Frederick Moll, M.D., Rob Younge, and John Freund.[39] Using technology licensed from another surgical company (SRI), they began development on what would ultimately become the da Vinci surgical robot, which was first installed in late 1998.[40] The da Vinci "became the first United States FDA-approved integrated robotic surgical system in July 2000," with Drs. William E. Kelley and Craig C. Owens performing the first procedure shortly thereafter.[41] The da Vinci's "first FDA clearance was for applications in general surgery; however, additional indications for thoracoscopic (chest) and radical prostatectomy procedures followed one year later."[42] Table 1 below lists each of the surgical procedures for which the da Vinci surgical robot has been "cleared by applicable regulatory agencies."[43]

Table 1
Approved da Vinci Surgical Procedures

Cardiac
Colorectal
General Surgery
Gynecology
Head and Neck
Thoracic
Urology

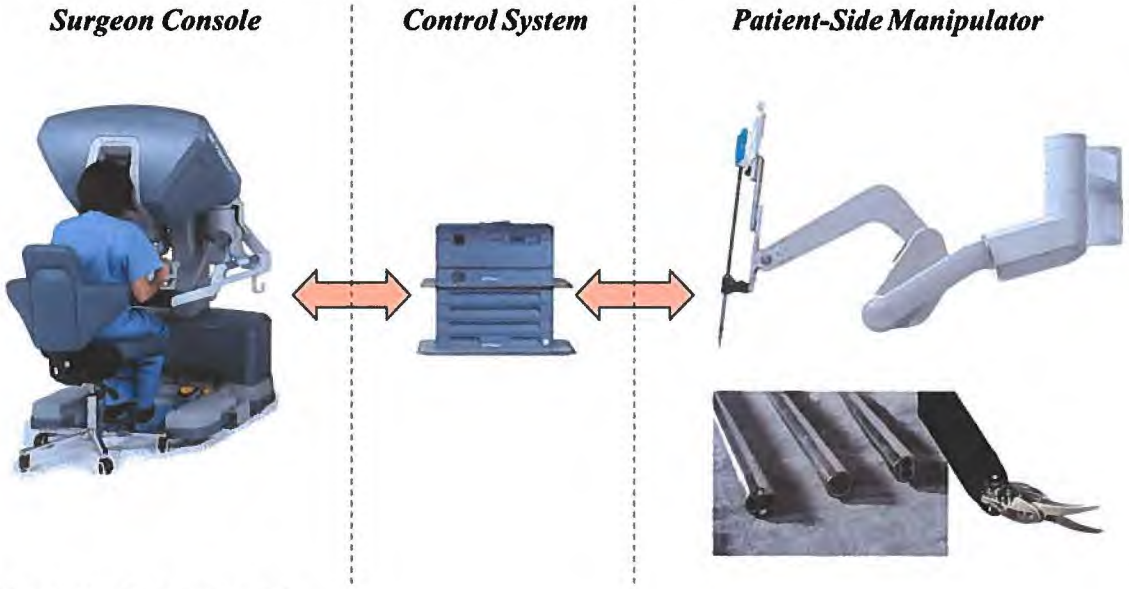
Source: Intuitive for Patients.

18. As illustrated in Figure 1 below, the da Vinci surgical robot is comprised of three separate components: the patient-side cart, the surgeon console, and the vision cart.[44]

[38] Business Research Company.
[39] Mahdi Azizian, May Liu, Iman Khalaji, and Simon DiMaio, "Chapter 1: The Da Vinci Surgical System," *The Encyclopedia of Medical Robotics*, Vol. 1, October 2018 (hereafter "Azizian et al.") 3-28 at p. 5.
[40] Azizian et al. at p. 5.
[41] Kelley at p. 355. See, also, Azizian et al. at p. 5; Longmore et al. at p. 1.
[42] Azizian et al. at p. 5.
[43] Intuitive Surgical, "Intuitive for Patients" (hereafter "Intuitive for Patients"). Available at: https://www.intuitive.com/en-us/patients/patients.
[44] Azizian et al. at p. 8.

Unlike in traditional laparoscopic surgery, the da Vinci is a surgical robot that utilizes a "teleoperation architecture," which allows the surgeon, through the surgeon console, to operate two interfaces that are used to control the manipulators (or arms) that are part of the patient side cart and operate on the patient via this robot.[45] At the surgeon console, the surgeon is seated and controls the movement of the surgical instruments that are positioned on the patient-side cart, while also using the console to view the patient and surgical field.[46] "Each manipulator may support either a stereo endoscopic camera or a surgical instrument, such as a grasper, a scissor, or a needle driver."[47]

Figure 1
Illustration of da Vinci Surgical Robot Architecture



Source: Azizian et al. at p. 8.

19. At the operating console, the robot translates the surgeon's hand movements, manipulating and rotating the instruments in real time as the surgery is being performed.[48] In traditional laparoscopic surgery, surgeons are limited by their own anatomy; their wrists and arms can only move so far and in certain directions, and the precision of human movement is limited. Further, in traditional laparoscopic surgery the

[45] Azizian et al. at pp. 7-8.
[46] Longmore et al. at pp. 4, 6; Azizian et al. at p. 7.
[47] Azizian et al. at p. 8.
[48] Intuitive Surgical, "About da Vinci Systems" (hereafter "About da Vinci Systems"). Available at: https://www.davincisurgery.com/da-vinci-systems/about-da-vinci-systems. See, also, Intuitive Surgical, Inc., SEC Form 10-K, filed February 10, 2021 (hereafter "Intuitive 2020 SEC Form 10-K") at p. 5.

instruments used are "long, rigid levers that rotate around a fulcrum, or pivot point, located at the port created in the body wall."[49] This "fulcrum effect" "reverses movements for the surgeon in laparoscopic surgery;" the instrument tips move in the opposite direction of the surgeon's hand, requiring the surgeon to adjust their hand-eye coordination and compensate for the reversal of directions caused by the pivot.[50] In contrast, the surgical instruments used by the da Vinci surgical robot mirror the surgeon's movement; if the surgeon moves their hand "to the right outside of the body causes the instrument inside the patient to be moved to the right."[51] Furthermore, da Vinci's extended range of motion helps to provide "greater dexterity" than can be achieved with "the human hand on its own."[52]

20. In addition to the benefits da Vinci's surgical instruments provides, the surgeon console also provides additional benefits to the surgeon. In traditional laparoscopic surgery, "the surgeon must look up and away from the instruments to a nearby 2D video monitor to see an image of the target anatomy."[53] Moreover, the "surgeon must also rely on his/her patient-side assistant to position the camera correctly."[54] In surgeries conducted with the da Vinci surgical robot, surgeons operate the robot and the instruments and reposition the camera while seated at a console ergonomically designed to allow natural hand-eye positioning and comfortable seating.[55]

21. While the conceptual and operational underpinnings of the da Vinci surgical robot have remained consistent, Intuitive has commercialized a number of different models over the years, as rapid technological development has allowed for more advanced equipment and instrumentation to be integrated into the da Vinci surgical robot. Intuitive

---

[49] Intuitive 2020 SEC Form 10-K at p. 5.
[50] Jaydeep H Palep, "Robotic assisted minimally invasive surgery," *Journal of Minimal Access Surgery*, Vol.5, No.1, January-March 2009, 1-7 at p. 1. See, also, Intuitive 2020 SEC Form 10-K at p. 5.
[51] Intuitive 2020 SEC Form 10-K at p. 5.
[52] UCLA Health, "About Robotic Surgery at UCLA." Available at: https://www.uclahealth.org/robotic-surgery/what-is-robotic-surgery.
[53] UC Health, "About the daVinci Surgical System" (hereafter "UC Health"). Available at: https://www.uchealth.com/services/robotic-surgery/patient-information/davinci-surgical-system/.
[54] UC Health.
[55] UC Health; SofMedica, "DaVinci Surgical System." Available at: https://sofmedica.com/our-portofolio/robotic-surgery/.

commercialized its da Vinci standard surgical robot in 1999.[56] Since then, it has released a number of updated models, including the da Vinci S, da Vinci Si, da Vinci Xi, da Vinci X, and da Vinci SP.[57] The da Vinci S and da Vinci Si models are no longer sold in the U.S.[58] A timeline of the commercialization of Intuitive's various da Vinci surgical robots is illustrated in Figure 2 below.

Figure 2
Commercialization Timeline of da Vinci Surgical Robots

Year	1999	2006	2009	2014	2017	2018
System	Standard[1]	S	Si	Xi	X	SP
						

Sources: Intuitive SEC Form 10-Q, filed on July 23, 2020 at p. 26; abex Excelencia Robotica.
[1] Fourth arm introduced in 2003.

22. In addition to the da Vinci surgical robot, Intuitive also designs and manufactures the surgical instruments that are attached to the ends of the robotic arms of the da Vinci robot. I understand that, "[d]ue to being commercially available for twenty years, the da Vinci RAS system has the largest library of end effectors available of all RAS systems."[59] These instruments, called EndoWrists, have tips that can be customized to accommodate various surgical procedures.[60] These surgical instrument attachments "are offered in a variety of diameters, of which 8mm and 12mm diameter sizes are the most commonly sold," and include "forceps, scissors, electrocautery tools, scalpels, and other surgical tools that are familiar to the surgeon from open surgery and conventional [minimally invasive surgery]."[61] Today, Intuitive offers approximately 70 different multi-

[56] Intuitive Surgical, Inc., SEC Form 10-Q, filed October 21, 2022 (hereafter "Intuitive 2022 SEC Form 10-Q") at p. 26. See, also, Intuitive Surgical, "Move Surgery Forward. Again. da Vinci SP." Available at: https://www.intuitive.com/en-us/products-and-services/da-vinci/systems/sp.
[57] Intuitive SEC Form 10-Q, September 2022 at p. 26. The da Vinci SP surgical system was designed to perform single port minimally invasive surgery. See the "da Vinci SP" page of the Intuitive website, available online at https://www.intuitive.com/en-us/products-and-services/da-vinci/systems/sp.
[58] 30(b)(6) Deposition of Marshall Mohr, November 7, 2022 at 59:22-60:10.
[59] Longmore et al. at p. 13. "Not only does the da Vinci RAS system have the largest variety of end effector types, it also has a large variety of each type of end effector." See Longmore et al. at p. 13.
[60] Intuitive Surgical, Inc., SEC Form 10-K, filed February 3, 2022 (hereafter "Intuitive 2021 SEC Form 10-K") at p. 7.
[61] Intuitive 2021 SEC Form 10-K at pp. 7-8.

port surgical instruments.[62] Figure 3 below illustrates examples of EndoWrist instruments that can be used in conjunction with Intuitive's da Vinci Xi and da Vinci X surgical robots.

Figure 3
Examples of EndoWrist Surgical Instruments

EndoWrist® Bipolar Cautery Instruments

Source: da Vinci Xi/X Instrument & Accessory Catalog, January 2019.

23. Each EndoWrist surgical instrument comes equipped with a programmed memory chip that helps to determine how the given EndoWrist instrument and the da Vinci surgical robot work together.[63] Additionally, the memory chip tracks the number of times that each EndoWrist surgical instrument is used in a surgical procedure and will "generally not allow the instrument to be used for more than the prescribed number of procedures."[64] EndoWrist surgical instruments used on S and Si da Vinci surgical robots operate via hardwire connection, while those used on Xi and X da Vinci surgical robots operate on a radio-frequency identification (RFID) system.[65] When the EndoWrist instrument reaches this prescribed number of uses, it will stop functioning and must be

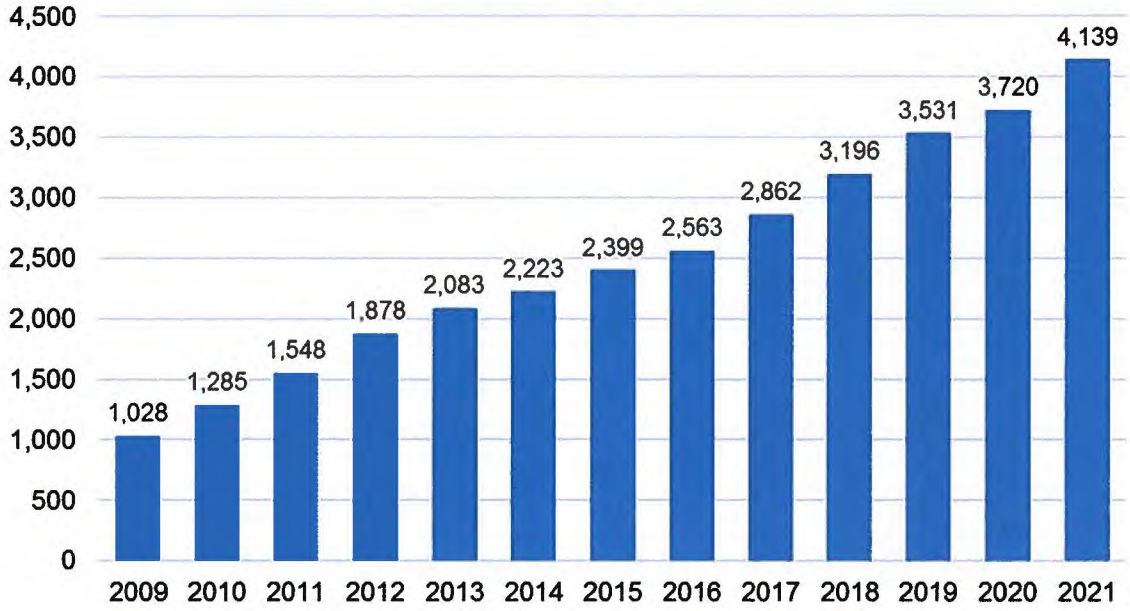
[62] Intuitive 2021 SEC Form 10-K at p. 55.
[63] Intuitive 2021 SEC Form 10-K at p. 8.
[64] Intuitive 2021 SEC Form 10-K at p. 8.
[65] Deposition of Anthony McGrogan, June 7, 2021 at 77:11-23.

replaced with a new instrument.[66] The standard number of uses for EndoWrist surgical instruments is ten, however, in October 2020, Intuitive launched an "Extended Use Program" which allows for twelve to 18 uses for select da Vinci Xi and da Vinci X surgical robots.[67] The fourth generation of da Vinci surgical robots ("da Vinci Xi" and "da Vinci X") utilize different EndoWrist surgical instruments that are not compatible with earlier generations of da Vinci surgical robots.[68]

24. The number of da Vinci surgical robots installed in hospitals in the U.S. has grown steadily over the last two decades. In 2005, there were nearly 300 da Vinci surgical robots installed in U.S. hospitals.[69] By 2010, Intuitive's installed base had grown to 1,285,[70] and by the end of 2021 it had reached more than 4,100.[71] Figure 4 below illustrates the growth of the da Vinci surgical robot's installed base in the U.S. from 2009 to 2021.

[66] Longmore et al. at p. 16.
[67] Longmore et al. at p. 16; Intuitive 2021 SEC Form 10-K at p. 8.
[68] Intuitive 2022 SEC Form 10-Q at p. 27.
[69] Intuitive reported an installed base of 296 da Vinci surgical robots in North America in 2005. See Intuitive Surgical, Inc., SEC Form 10-K, filed March 15, 2006 at p. 33.
[70] Intuitive Surgical, Inc., SEC Form 10-K, filed February 1, 2011 at p. 43.
[71] Intuitive 2021 SEC Form 10-K at p. 12.

Figure 4
Installed Base of da Vinci Surgical Robots in the United States
2009 - 2021



Source: Intuitive SEC Form 10-Ks, 2009 - 2021.

25. Along with the steady growth in the installed base of da Vinci surgical robots, Intuitive's Instruments and Accessories business segment (which primarily includes its sales of EndoWrist surgical instruments) has also achieved significant growth in recent years. For example, as shown in Table 2 below, from 2017 to 2021, Intuitive's revenues from its Instruments and Accessories business segment in the U.S. increased 76.2 percent. Instruments and Accessories' growth in sales outpaced Intuitive's other business segments, Systems (which primarily consists of sales of da Vinci surgical robots) and Service, whose sales increased 69.8 percent and 43.9 percent, respectively, during this time. The Instruments and Accessories business segment accounts for a significant portion of Intuitive's overall U.S. revenues; in 2021, Instruments and Accessories sales accounted for 57.7 percent of Intuitive's overall revenues in the U.S.

Table 2
Intuitive U.S. Revenue by Business Segment
2017 - 2021

(in millions $)

Business Segment	2017	2018	2019	2020	2021	% Change
Systems	$ 603.5	$ 692.2	$ 830.7	$ 695.0	$ 1,024.8	*69.8%*
Instruments and Accessories	$ 1,263.1	$ 1,485.2	$ 1,790.4	$ 1,785.1	$ 2,225.1	*76.2%*
Service	$ 419.2	$ 456.1	$ 508.4	$ 482.6	$ 603.3	*43.9%*
Total	**$ 2,285.8**	**$ 2,633.5**	**$ 3,129.5**	**$ 2,962.7**	**$ 3,853.2**	

Source: 2021 Intuituve SEC Form 10-K at p.102, 2020 Intuitive SEC Form 10-K at p. 98; Intuitive Surgical, Inc., SEC Form 10-K, filed on February 7, 2020 at p. 87.

III. The Market for MIST Surgical Robots in the United States Constitutes a Relevant Antitrust Market

26. As I previously discussed, I understand from Counsel for the Plaintiff that Plaintiff's allegations in this matter relate to Intuitive's use of its dominance of the market for minimally invasive soft tissue surgical robots with its da Vinci surgical robots to maintain its monopoly in a separate market: the market for replacements and repairs of EndoWrists, which are surgical instruments (e.g., graspers, forceps, scissors, etc.) that are used during the da Vinci robotic surgeries. To evaluate Plaintiff's claims in this regard, it is necessary to determine whether the tying market, the market for MIST Surgical Robots in the United States, constitutes a relevant antitrust market. Based on my analysis of the documents and data produced in this litigation, as well as my training and experience in economics and my research and analysis into the market for MIST Surgical Robots in the United States, I have concluded that the market for MIST Surgical Robots constitutes the relevant antitrust product market in which sales of da Vinci surgical robots occurs. I have also concluded that the United States constitutes the relevant antitrust geographic market with respect to the tying market for evaluating the Alleged Misconduct. I discuss my bases for these conclusions below.

A. The Market for MIST Surgical Robots is a Relevant Antitrust Product Market

27. In economics, a relevant antitrust product market is comprised of the smallest possible set of goods for which a hypothetical monopolist could exercise market power to raise prices on that set of products by a small, but significant, amount without losing so

much in sales volume that the increase in price is unprofitable.[72] If the analysis concludes that there are other products which would make such a price increase unprofitable, the market definition is broadened to include that set of goods, and the hypothetical monopolist test is applied again. In general, an economic analysis of the relevant antitrust product market requires identifying "products that are close demand or supply substitutes."[73] That is, a relevant market should contain all the products which are substitutable for each other in the face of small but significant, non-transitory price increases; an analysis of the relevant market thus necessarily focuses on an analysis of *economic* substitutability. Based on my research and analysis into the tying market (the market for MIST Surgical Robots) and my training and experience in economics, I have determined that the market for MIST Surgical Robots constitutes a relevant antitrust product market, and that sales of da Vinci surgical robots occur in this relevant antitrust product market. I base this conclusion on the fact that there are no economic substitutes for minimally invasive soft tissue surgeries performed with MIST Surgical Robots and that MIST Surgical Robots are a necessary input in performance of those surgeries. In particular, as I describe below, other forms of minimally invasive soft tissue surgery (such as traditional laparoscopic surgery) and non-MIST robotic surgeries are not economic substitutes for robotically assisted minimally invasive soft tissue surgeries. Therefore, because there are no economic substitutes for robotically assisted minimally

---

[72] One of the tools economists rely upon in defining relevant antitrust product and geographic markets is the so-called "SSNIP" test. A SSNIP test is based upon a hypothetical "small but significant and non-transitory increase in price," as described in the Horizontal Merger Guidelines. The SSNIP test is used by the FTC and the DOJ to define relevant economic markets. The SSNIP test is intended to ascertain whether a hypothetical monopolist can exercise market power in a relevant product or geographic market. If the hypothetical monopolist is able to permanently (that is, in a "non-transitory" way) raise prices for a product or group of products by a "small but significant" amount, usually assumed to be five percent, without losing so much in sales volume that the increase in price is unprofitable, then that product or group of products constitutes a relevant antitrust product market. See U.S. Department of Justice and the Federal Trade Commission, "Horizontal Merger Guidelines," August 19, 2010 (hereafter "Horizontal Merger Guidelines") at § 4.1.1. "Even when the evidence necessary to perform the hypothetical monopolist test quantitatively is not available, the conceptual framework of the test provides a useful methodological tool for gathering and analyzing evidence pertinent to customer substitution and to market definition." See Horizontal Merger Guidelines at § 4.1.3.

[73] Dennis Carlton and Jeffrey Perloff, *Modern Industrial Organization*. Fourth Edition Global, Reading, MA: Addison Wesley, 2015 (hereafter "Carlton & Perloff") at p. 670. "Product B is a *demand substitute* for A if an increase in the price of A causes consumers to use more B instead. Product B is a *supply substitute* for A if, in response to an increase in the price of A, firms that are producing B switch some of their production facilities to the production of A." See Carlton and Perloff at p. 646 (emphasis in original). See, also, Horizontal Merger Guidelines at § 4.

invasive soft tissue surgeries, which are defined by the use of the MIST Surgical Robot (of which da Vinci is the dominant type during the Relevant Period), there are no economic substitutes for MIST Surgical Robots.

28. Furthermore, evidence demonstrates that the market for MIST Surgical Robots is not part of the same relevant antitrust market as the market for minimally invasive soft tissue surgeries performed with MIST Surgical Robots. For instance, one market is an input market (the market for MIST Surgical Robots) and the other is an output market (the market for or minimally invasive soft tissue surgeries performed with MIST Surgical Robots). Further, given this distinction, these two markets have distinct customer bases (MIST Surgical Robots are sold to hospitals, that, in turn, use these surgical robots as a necessary input in the performance of robotically assisted minimally invasive soft tissue surgeries that they sell to their customers, including patients and/or third-party payors such as health insurance companies). In addition, later in this Expert Report I discuss evidence demonstrating that the market for MIST Surgical Robots is distinct from the EndoWrist Repair and Replacement Market.

29. A product is an "economic substitute" for another product if a small but significant change in price for that product results in increased demand for the other product.[74] The change in price necessary to cause consumers to switch to a substitute good is often considered to be around five percent.[75] I discuss the evidence, both from the public domain and in documents produced in discovery as part of this litigation, demonstrating that there were no available economic substitutes for minimally invasive soft tissue surgeries performed using MIST Surgical Robots during the Relevant Period and thus there are no economic substitutes for MIST Surgical Robots, in greater detail below.

[74] Robert S. Pindyck and Daniel L. Rubinfield, *Microeconomics*, Eighth Edition, Upper Saddle River, New Jersey: Pearson Education, 2013 (hereafter "Pindyck & Rubinfeld (8th edition)") at pp. 24-25.
[75] Five percent is the number commonly adopted by the U.S. Department of Justice and the Federal Trade Commission when evaluating the competitive effects of mergers. See Horizontal Merger Guidelines at § 4.1.2.

i. Traditional Laparoscopic Surgeries are Not an Economic Substitute for Minimally Invasive Soft Tissue Surgeries Performed with MIST Surgical Robots, and Thus Do Not Discipline Pricing of MIST Surgical Robots

30. Earlier in this Expert Report I discussed traditional laparoscopic surgeries and how they compared to surgeries performed with MIST Surgical Robots. While many surgeries can be performed by use of either a MIST Surgical Robot or by way of a traditional laparoscopic surgery, meaning that the two may be to some extent *functional* substitutes, evidence I have reviewed demonstrates that traditional laparoscopic surgeries are, at best, only limited functional substitutes and not economic substitutes for minimally invasive soft tissue surgeries performed using MIST Surgical Robots.[76] For example, Stacey Donovan, Executive Director of Surgical Services at Evergreen Health (a hospital located in Kirkland, WA), testified:

> Q. If Intuitive raised the price of the da Vinci robot by 5 to 10 percent, would your hospital have looked to perform more traditional nonrobotic surgeries instead of acquiring the da Vinci robot? [...]
>
> THE WITNESS: No, we would not have. [...]
>
> Q. And why not?
>
> A. We would have - - we would have lost business if we chose to not - - if we chose to not have a - - the option of minimally invasive robotic surgery at Evergreen, we would have surgeons that would leave, and we would lose revenue.[77]

Similarly, Edward Harrich, Director of Surgical Services at Pullman Regional Hospital, testified that Pullman Regional Hospital would not "look to perform more traditional, nonrobotic surgeries instead of purchasing a da Vinci robot" if faced with a similar "5 to 10 percent" price increase, adding that he did not believe such a price increase "would

[76] As a matter of economics, the distinction between functional substitutes and economic substitutes is important; two goods are only economic substitutes when the price of one disciplines the price of the other. For example, one could use either drywall or plaster lath to build a house. They are functional substitutes, but they are not *economic* substitutes as a decrease in the price of plaster lath of a "small but significant" amount would not have a significant adverse impact on drywall sales. The key issue in determining whether two products are economic substitutes is whether customers would switch from one product to the other *in response to a change in their relative prices.*

[77] Deposition of Stacey Donovan, May 27, 2021 (hereafter "Donovan Deposition") at 9:3-14, 44:20-45:9.

play a factor" in the decision of whether to perform more traditional laparoscopic surgeries in lieu of purchasing a da Vinci surgical robot.[78]

31. The evidence discussed above demonstrates that a nominal change in price for MIST Surgical Robots (namely, Intuitive's da Vinci robot), which would have resulted in a significant increase in the price of the surgeries performed using those surgical robots, would not result in increased demand for traditional laparoscopic surgeries. This constitutes one form of evidence demonstrating that traditional laparoscopic surgeries are not economic substitutes for surgeries performed with MIST Surgical Robots and, thus, are not part of the same relevant antitrust product market as MIST Surgical Robots. I discuss additional evidence that forms the basis of this conclusion in more detail below.

a. Intuitive Acknowledged that it Did Not View Traditional Laparoscopic Surgery as Competition for Surgeries performed with MIST Surgical Robots

32. One form of evidence demonstrating that traditional laparoscopic surgeries did not constitute economic substitutes for minimally invasive soft tissue surgeries performed using MIST Surgical Robots is that Intuitive itself acknowledges that it did not view traditional laparoscopic surgeries as competition for its da Vinci surgical robots. For example, in a "preparation document for a panel discussion at a society surgeon led meeting,"[79] in response to a potential question about whether it planned to "go into laparoscopic surgery," Intuitive stated: "We do not see ourselves in competition with laparoscopy. It is about the right tool for the right job."[80] In response to a July 2017 request from a colleague regarding an analysis of pricing per procedure, Bob DeSantis, Intuitive's Executive Vice President and Chief Product Officer, responded: "Your analysis is grounded on procedure pricing vs competitive lap. While this is a consideration, I'm not sure it's the primary one. I think our value proposition vs lap is a winning one today in targeted procedures."[81] Among the "bigger considerations" noted

[78] Deposition of Edward W. Harrich, May 24, 2021 (hereafter "Harrich Deposition") at 9:5-9, 51:7-16.
[79] Deposition of Glenn Vavoso, May 14, 2021 (hereafter "Vavoso Deposition") at 65:16-69:12, Exhibit 8, Exhibit 9.
[80] Vavoso Deposition Exhibit 9 at Intuitive-00269126.
[81] 30(b)(6) Deposition of Bob DeSantis, May 27, 2021 (hereafter "DeSantis Deposition") Exhibit 4 at Intuitive-00147735.

by Mr. DeSantis was "a true robotic competitive threat."[82] Regarding this statement, Mr. DeSantis testified:

> Q. What did you mean when you said "a true robotic competitive threat"?
>
> A. So my thought here was that robotics is differentiated from lap and its value proposition. So therefore, when we think about our place in the market, we should be thinking about our robotic offering versus other robotic offerings rather than lap.[83]

33. Further, evidence demonstrates that Intuitive requires many of its employees to sign non-compete agreements. In those agreements, Intuitive defines competitors as "any business which directly competes, or plans to compete, with the Company in any of the following areas: robotic assisted surgery, robotic assisted catheter control, augmented reality surgery."[84] Thus, Intuitive's own definition of competitors in these agreements does not make any mention of non-robotic surgery.

34. The evidence discussed above demonstrates that Intuitive itself did not view traditional laparoscopic surgery as competition for surgeries performed with its da Vinci MIST Surgical Robots. This constitutes one form of evidence demonstrating that traditional laparoscopic surgeries are not economic substitutes for minimally invasive soft tissue surgeries performed using MIST Surgical Robots, and, thus, are not part of the same relevant antitrust product market as MIST Surgical Robots.

b. MIST Surgical Robots such as Da Vinci Possess Different Features and Benefits to Surgeons and Patients Compared to Traditional Laparoscopic Surgeries

35. Another form of evidence I have reviewed that demonstrates that traditional laparoscopic surgeries are not economic substitutes for minimally invasive soft tissue surgeries performed using MIST Surgical Robots is the different features and benefits that MIST Surgical Robots (such as Intuitive's da Vinci robot) possess compared to

[82] DeSantis Deposition Exhibit 4 at Intuitive-00147735 (emphasis in original).
[83] DeSantis Deposition at 29:20-30:2.
[84] Vavoso Deposition Exhibit 21 at Intuitive-00423276.

traditional laparoscopic surgical procedures. As a November 2018 Goldman Sachs report on "Robotic Surgery and the OR of the Future," noted:

> Successful treatment was often dependent on selection of a "good surgeon" which is a highly qualitative and subjective process. With the advent of robotic surgery, surgical procedures have become more minimally invasive, more closely linked to technological advances in imaging/novel design of end effectors, and seen improved precision and patient outcomes.[85]

36. At deposition, Stacey Donovan of Evergreen Hospital testified that the benefits of da Vinci surgery over traditional laparoscopic surgery for surgeons included "greater dexterity, better visualization, easier access to areas inside a body cavity that are difficult to access with traditional laparoscopic instruments. They have 3D vision rather than 2D vision, which you traditionally get with laparoscopic surgery."[86] Edward Harrich of Pullman Regional Hospital testified that, "[w]hen compared to traditional or laparoscopic surgery," da Vinci surgical robots resulted in "patients report[ing] less pain, less scarring, a shorter hospital stay, and a quicker return to their daily activities."[87] When asked in an interview about the "biggest benefits of using surgical robots today," Dr. Jay Redan, Chief of Surgery at Florida Hospital-Celebration Health, responded: "The benefit to the doctor and patient is better visualization, more precise surgery and fewer complications that can hopefully be better outcomes (yet to be proven)."[88]

37. Evidence of da Vinci's different features and benefits that I have reviewed includes acknowledgements of such features and benefits made by Intuitive itself. For example, in its 2020 Form 10-K, Intuitive described its da Vinci surgical robot in the following way:

---

[85] Isaac Ro, Veronika Dubajova, CFA, Akinori Ueda, Ph. D., Ziyi Chen, Jack O'Connell, Sara Silverman, and Frits Jonker, "Digital Health: Robotic Surgery and the OR of the Future," Goldman Sachs: Equity Research, November 15, 2018 (hereafter "November 2018 Goldman Sachs Report") 1-16 at p. 9.
[86] Donovan Deposition at 18:22-19:11. Ms. Donovan added that da Vinci surgery "also, with [the] addition of -- it's a called Firefly or it -- it's a medication that's given that lights up tissues. It provides a better delineation between healthy tissues and tissues that may have cancer involved." Donovan Deposition at 18:22-19:11.
[87] Harrich Deposition at 17:11-20:22.
[88] November 2018 Goldman Sachs Report at p. 6. Dr. Redan also noted that the "benefits of being an early adopter of successful technology is a benefit to the hospital." November 2018 Goldman Sachs Report at p. 6.

> Da Vinci Surgical Systems enable surgeons to extend the benefits of MIS [minimally invasive surgery] to many patients who would otherwise undergo a more invasive surgery by using computational, robotic, and imaging technologies to overcome many of the limitations of traditional open surgery or conventional MIS. Surgeons using a da Vinci Surgical System operate while seated comfortably at a console viewing a 3D, high-definition image of the surgical field. This immersive console connects surgeons to the surgical field and their instruments. While seated at the console, the surgeon manipulates instrument controls in a natural manner, similar to open surgical technique. Our technology is designed to provide surgeons with a range of articulation of the surgical instruments used in the surgical field analogous to the motions of a human wrist, while filtering out the tremor inherent in a surgeon's hand.[89]

38. In this same 2020 Form 10-K, Intuitive lists the following "features and benefits to surgeons" of its da Vinci surgical robot:

- Immersive 3DHD Visualization[90]
- Precise and Tremor-Free Endoscope Control[91]
- Advanced Instruments[92]

---

[89] Intuitive 2020 SEC Form 10-K at p. 52. Intuitive also states: "The da Vinci Surgical System is designed to enable complex surgery using a minimally invasive approach. It consists of an ergonomic surgeon console or consoles, a patient-side cart with an interactive arm or arms, a high-performance vision system, and proprietary instruments and accessories. Surgeons using the da Vinci system operate while seated comfortably at a console viewing a three-dimensional, high definition ('3DHD') image of the surgical field. This immersive visualization connects surgeons to the surgical field and their instruments. While seated at the console, the surgeon manipulates instrument controls in a natural manner, similar to the open surgery approach." See Intuitive 2020 SEC Form 10-K at p. 4.

[90] Intuitive 2020 SEC Form 10-K at p. 4. "Our vision system includes a 3DHD endoscope with two independent vision channels linked to two separate color monitors through sophisticated image processing electronics. The da Vinci Surgical System provides visualization of the target anatomy with natural depth-of-field and magnification that is intended to facilitate accurate tissue identification and tissue layer differentiation. With our Firefly Fluorescence Imaging technology, surgeons can use our specialized imaging hardware in combination with an injectable fluorescent dye to visualize vasculature, tissue perfusion, or biliary ducts beneath tissue surfaces in real-time." See Intuitive 2020 SEC Form 10-K at p. 4.

[91] Intuitive 2020 SEC Form 10-K at p. 4. "Our imaging system also incorporates our proprietary camera control technology that allows the surgeon to easily change, move, zoom, and rotate his or her field of vision. Surgeons can reposition the surgical camera quickly with foot controls or zoom in, out, up, down, left, or right by moving their hands while maintaining a stable image." See Intuitive 2020 SEC Form 10-K at p. 4.

[92] Intuitive 2020 SEC Form 10-K at p. 4. "We offer a comprehensive suite of stapling, energy, and core instrumentation for our surgical systems. Most of our proprietary instruments feature EndoWrist technology, incorporating "wrist" joints. Inspired by the human hand, our wristed instruments enable

- Intuitive Instrument Movement[93]
- Scaled, Tremor Filtered Instrument Movement[94]
- Improved Surgeon Ergonomics[95]
- Multi-Specialty Surgical Platform[96]
- Advanced Training Tools[97]

Consistent with the features and benefits discussed above, both Glenn Vavoso (Senior Vice President and General Manager for Asia and Indirect Global markets) and Bob DeSantis (Executive Vice President and Chief Product Officer) of Intuitive testified to the many features and benefits da Vinci surgical robots possess over traditional laparoscopic surgery.[98]

---

surgeons to orient the instruments carefully relative to the tissue and suture with precision, just as they can in open surgery." See Intuitive 2020 SEC Form 10-K at p. 4.

[93] Intuitive 2020 SEC Form 10-K at p. 5. "Our technology is designed to transform the surgeon's natural hand movements outside of the body into corresponding micro-movements inside the patient's body. For example, with the da Vinci Surgical System, a hand movement to the right outside of the body causes the instrument inside the patient to be moved to the right. In contrast, conventional minimally invasive surgery ("MIS") instruments are long, rigid levers that rotate around a fulcrum, or pivot point, located at the port created in the body wall. In conventional MIS, the instrument tip moves in the opposite direction from the surgeon's hand, and surgeons must adjust their hand-eye coordination to compensate for the direction reversal by the pivot." See Intuitive 2020 SEC Form 10-K at p. 5.

[94] Intuitive 2020 SEC Form 10-K at p. 5. "With our technology, a surgeon can also use "motion scaling," a feature that translates, for example, a three-millimeter hand movement outside the patient's body into a one-millimeter instrument movement in the surgical field inside the patient's body. Motion scaling is designed to allow precision and control for delicate tasks. In addition, our technology filters the tremor inherent in a surgeon's hands." See Intuitive 2020 SEC Form 10-K at p. 5.

[95] Intuitive 2020 SEC Form 10-K at p. 5. "The da Vinci Surgical System is designed to allow surgeons to operate while seated, which may be clinically advantageous because of reduced surgeon fatigue. The da Vinci Surgical System's design provides natural hand-eye alignment at the surgeon's console. Because the da Vinci Surgical System's robotic arms hold the camera and instruments steady, there is less surgeon and assistant fatigue." See Intuitive 2020 SEC Form 10-K at p. 5.

[96] Intuitive 2020 SEC Form 10-K at p. 5. "The da Vinci Surgical System is designed to enable surgeons to perform a wide range of surgical procedures within our targeted gynecologic, urologic, general surgery, cardiothoracic, and head and neck specialties. To date, surgeons have used the da Vinci Surgical System to perform dozens of different types of surgical procedures. While we do not expect all of these different types of procedures to become widely adopted, they demonstrate the flexibility of the da Vinci Surgical System." See Intuitive 2020 SEC Form 10-K at p. 5.

[97] Intuitive 2020 SEC Form 10-K at p. 5. "Training technologies include our Simulation program, which provides for independent da Vinci skills development through interactive Virtual Reality ("VR") exercises, and our telementoring program, which provides real-time, surgeon-to-surgeon learning and collaboration during robotic-assisted surgery with a da Vinci Surgical System." See Intuitive 2020 SEC Form 10-K at p. 5.

[98] See, for example, Vavoso Deposition at 32:18-48:15; DeSantis Deposition at 107:12-114:1.

39. The evidence discussed above demonstrates that MIST Surgical Robots possess different features and benefits to surgeons and patients over traditional laparoscopic surgery. Consistent with the evidence discussed earlier in this Expert Report, hospitals are unlikely forego these features and benefits of MIST Surgical Robots in response to a small but significant increase in price. This constitutes one piece of evidence demonstrating that traditional laparoscopic surgeries are not economic substitutes for minimally invasive soft tissue surgeries performed using MIST Surgical Robots and that MIST Surgical Robots constitute a relevant antitrust product market.

c. Non-Clinical Benefits of MIST Surgical Robots Compared to Traditional Laparoscopic Surgeries

40. Additional evidence I have reviewed demonstrating that traditional laparoscopic surgeries are not economic substitutes for surgeries performed with MIST Surgical Robots includes various other non-clinical benefits to hospitals that utilize MIST Surgical Robots. One such non-clinical benefit is derived from a hospital's marketing of its use of MIST Surgical Robots, such as da Vinci, to increase profits. For example, a November 2018 Goldman Sachs report on "Robotic Surgery and the OR of the Future" noted:

> **[R]obotic surgery has become a very effective marketing tool for hospitals** who adopt the technology. Many surgical procedures are important profit centers to a hospital which in turn created an incentive for early adopters to advertise these capabilities directly to patients in an attempt to portray the institution as a leading center of excellence for complex illnesses such as cancer.[99]

This report added that, "[f]or hospitals, **general surgery procedures are likely to remain key profit centers, making capital spending for value-add technologies a continued priority."**[100] In 2013, Memorial Hospital in Douglass, WY purchased a $2 million da Vinci surgical robot.[101] Regarding that purchase, Memorial Hospital's CEO,

---

[99] November 2018 Goldman Sachs Report at p. 10 (emphasis in original).
[100] November 2018 Goldman Sachs Report at p. 10 (emphasis in original). This report further noted: "We therefore believe the continued adoption of these technologies will have far-reaching implications for the business model around general surgery." See November 2018 Goldman Sachs Report at p. 10.
[101] Jaimy Lee, "Surgical-Robot Costs Put Small Hospitals in a Bind," *Modern Healthcare*, April 19, 2014 (hereafter "Lee"). Available at: https://www.modernhealthcare.com/article/20140419/MAGAZINE/304199985/surgical-robot-costs-put-small-hospitals-in-a-bind.

Ryan Smith, said that he "doesn't mind if it takes awhile for the pricey new piece of equipment to pay off because it's already attracting patients who previously would have traveled to other hospitals in Colorado or Utah to get robotic surgery."[102] One 2004 academic journal article noted:

> In today's competitive healthcare market, many organizations are interested in making themselves "cutting-edge" institutions with the most advanced technological equipment and the very newest treatment and testing modalities. Doing so allows them to capture more of the healthcare market. Acquiring a surgical robot is in essence the entry fee into marketing an institution's surgical specialties as "the most advanced." It is not uncommon, for example, to see a photo of a surgical robot on the cover of a hospital's marketing brochure and yet see no word mentioning robotic surgery inside.[103]

Similarly, a 2014 article regarding the use of technology at rural hospitals noted that "[t]hroughout the country, hospital leaders are looking at ways they can strengthen their bottom line using technologies that better serve their communities and keep patients closer to home."[104] This article discussed two rural Minnesota hospitals (Sanford Bemidji Medical Center ("SBMC") and Essential Health-St. Joseph's Medical Center) that have purchased da Vinci surgical robots, with Joy Johnson, Chief Operating Officer at SBMC, stating about the purchase: "Patients want robotic surgery because it means shorter hospital stays and faster recoveries for them. New physician surgical grads are trained in robotic surgery and they want to use those skills. If patient retention and physician recruitment are negatively impacted, that can impact a hospital's bottom line."[105]

41. At deposition, Edward Harrich, Director of Surgical Services at Pullman Regional Hospital, testified that if "Pullman Regional did not have a da Vinci surgical robot" that it

---

[102] Lee.
[103] Anthony R. Lanfranco, BAS, Andres E. Castellanos, MD, Jaydev P. Desai, PhD, and William C. Meyers, MD, "Robotic Surgery: A Current Perspective," *Annals of Surgery*, Vol. 239, No. 1, January 2004, 14-21 at p. 19.
[104] Candi Helseth, "Technology Widens Care Options for Rural Hospitals," *The Rural Monitor*, February 12, 2014 (hereafter "The Rural Monitor").
[105] The Rural Monitor. Mr. Johnson further noted that "[p]atients want to stay close to home for care but they will travel long distances for best practice surgical options," adding that "rural hospitals must be proactive technologically to maintain a solid bottom line." See The Rural Monitor.

would lose customers.[106] As Intuitive noted along with an internal da Vinci marketing presentation: "Throughout the country, hospitals are looking to diversify their payor mix in an effort to attract or retain more commercially/privately insured patients. Premier data shows that for the core procedures, da Vinci surgery attracts more commercially insured patients compared to laparoscopic and open surgery."[107]

42. Furthermore, another non-clinical benefit to hospitals performing robot-assisted minimally invasive soft tissue surgeries is the impact doing so has on those hospitals' overall surgeon recruitment and/or retention efforts. As noted in the same November 2018 Goldman Sachs report discussed above, "the rise of robotics has **significant implications for hospital recruitment** of new physicians as training on these technologies now begins in medical school."[108] In an October 2020 op-ed, Eve Cunningham, MD, MBA, the Chief Medical Officer of Providence Medical Group, stated: "Mass exodus of surgeons or recruitment challenges are a risk if robots are restricted or removed from facilities."[109]

43. At deposition, Stacey Donovan of Evergreen Hospital testified:

> Q. Does the fact that your hospital has da Vinci surgical robots help your hospital attract top surgeons?
>
> A. Yes, it does.
>
> Q. If your hospital no longer had any da Vinci surgical robots, would your hospital lose some top surgeons? [...]
>
> THE WITNESS: Yes, we would.[110]

Similarly, Edward Harrich of Pullman Regional Hospital, testified that the "fact that [his] hospital has a da Vinci surgical robot help[s] [his] hospital attract top surgeons," and further that there was a good chance losing its da Vinci robots would cause Pullman

---

[106] Harrich Deposition at 23:3-7.
[107] Intuitive-00001237-1311 at 1283.
[108] November 2018 Goldman Sachs Report at p. 10 (emphasis in original).
[109] Eve Cunningham, MD, MBA, "Op-Ed: Addressing Our Da Vinci Addiction – A call to action for everyone in healthcare," MedPage Today, October 17, 2020 (hereafter "Cunningham"). Available at: https://www.medpagetoday.com/surgery/generalsurgery/89175.
[110] Donovan Deposition at 15:7-16.

Hospital to lose surgeons (as it did once before prior to the time Pullman had plans to purchase its first da Vinci surgical robot).[111]

44. Further, Intuitive itself noted in a May 2019 corporate marketing presentation that hospital decision makers believe that owning a da Vinci surgical robot "[e]nables hospitals to attract surgeons and their patients."[112] In a set of notes emailed to Intuitive colleagues regarding a da Vinci marketing campaign, Suresh Sathyamurthy of Intuitive proposed informing "US Hospital Executives and Decision Makers (CEO, CFO)" that owning a da Vinci surgical robot "[a]ttracts surgeons to hospitals (and surgeons bring patients/procedures) to drive business (Aligns with Growth objectives for Hospital executives from decision maker study)."[113] Another Intuitive internal marketing presentation included a slide that "shows the proliferation of da Vinci surgery in urology, gynecology, and general surgery resident / fellowship programs, and implies growing surgeon interest in having access to a da Vinci Surgical System," adding: "Attracting physicians is among hospital CEOs' top imperatives. As hospitals evaluate da Vinci surgery and opportunities to attract surgeons, they should consider the proliferation of da Vinci surgery in residency and fellowship programs where physicians are being exposed to robotic-assisted surgery."[114]

45. The evidence discussed above demonstrates various other non-clinical benefits to hospitals that utilize MIST Surgical Robots compared to traditional laparoscopic surgery. This constitutes another piece of evidence demonstrating that traditional laparoscopic surgeries are not economic substitutes for minimally invasive soft tissue surgeries performed using MIST Surgical Robots and further that MIST Surgical Robots constitute a relevant antitrust product market.

---

[111] Harrich Deposition at 11:21-14:21, 51:18-24, 125:10-126:8.
[112] Intuitive-00073538-559 at 541.
[113] Intuitive-00014395-96 at 95.
[114] Intuitive-00001237-1311 at 1286. Intuitive further noted: "In the case of URO, 96% of hospitals with urology residency programs are performing da Vinci Surgery. As shown here, da Vinci surgery is being rapidly adopted by residencies and fellowships across specialties. A successful da Vinci surgery program can help attract top talent." See Intuitive-00001237-1311 at 1286.

ii. Non-MIST Surgical Robots are Not Economic Substitutes for MIST Surgical Robots and, Therefore, Cannot Be Substituted for MIST Surgical Robots in the Performance of Minimally Invasive Soft Tissue Surgeries

46. In addition to MIST Surgical Robots, other types of surgical robots have been approved by the FDA to perform a variety of different surgical procedures. For example, at deposition, Bob DeSantis, Executive Vice President and Chief Product Officer at Intuitive, identified other types of surgical robots in the U.S., including surgical robots that perform orthopedic, endoluminal, and cardiac procedures.[115] Evidence I have reviewed demonstrates that non-MIST Surgical Robots such as these are not functional substitutes for MIST Surgical Robots, as they do not perform the same types of surgical procedures as MIST Surgical Robots. Given that these non-MIST Surgical Robots are not functional substitutes for MIST Surgical Robots, they therefore are not economic substitutes for MIST Surgical Robots either. Thus, these other types of surgical robots are not part of the relevant antitrust product market.

47. At deposition, Mr. DeSantis testified that orthopedic, endoluminal, and cardiac surgical robots "aren't soft tissue surgical robots."[116] Mr. DeSantis further testified:

> Q. Is it your understanding that robots that don't perform any of the same procedures as the da Vinci robot are in direct competition with the da Vinci soft tissue surgical robot?
>
> A. Today, if they're not performing the same procedures that we are performing, I think that's a fair statement. Then we're not in competition, by definition.[117]

Mr. DeSantis further testified that there were no other surgical robots that have FDA clearance to perform all of the same surgical procedures as da Vinci in the United States.[118] Mr. DeSantis also testified that the only FDA-approved robot that poses a

---

[115] DeSantis Deposition at 38:15-39:19.
[116] DeSantis Deposition at 38:15-39:22.
[117] DeSantis Deposition at 78:17-24.
[118] DeSantis Deposition at 78:25-79:21. See, also, Vavoso Deposition at 111:24-112:13. At his May 2021 deposition, Glenn Vavoso of Intuitive testified that there are only two other surgical robots that had FDA approval to perform minimally invasive soft tissue surgeries in the U.S.: TransEnterix's Senhance surgical robot and Medrobotics' Flex surgical robot. See Vavoso Deposition at 85:20-98:5. However, as I discuss in greater detail later in this Expert Report, neither of these surgical robots is FDA approved for all the same indications as Intuitive's da Vinci surgical robot. See Vavoso Deposition at 98:18-113:15.

competitive threat is the TransEnterix Senhance.[119] Glenn Vavoso of Intuitive similarly testified that there were no other FDA-approved surgical robots that performed all of the same surgical procedures as the da Vinci surgical robot.[120] Similarly, in a January 2019 email to colleagues responding to a question of who he thought "are considered competitors" of Intuitive, Larry Cesnik of Intuitive flagged a handful of surgical robot manufacturers from the list he was given, noting: "I believe the ones in red are not direct competitors, since they do not do SOFT TISSUE robotic surgery."[121]

48. The evidence discussed above demonstrates that non-MIST Surgical Robots including the ones discussed above do not perform the same surgical procedures as MIST Surgical Robots such as da Vinci and, therefore, cannot be substituted for MIST Surgical Robots in the performance of minimally invasive soft tissue surgeries.[122] Therefore, given that these non-MIST Surgical Robots are not functional substitutes for MIST Surgical Robots, it is not possible for them to be economic substitutes for MIST Surgical Robots in the performance of minimally invasive soft tissue surgeries. This constitutes another piece of evidence demonstrating that the tying market, the market for MIST Surgical Robots, constitutes a relevant antitrust product market.

B. The Relevant Antitrust Geographic Market with Regards to the Tying Market is the United States

49. As part of my analysis of Plaintiff's claims with respect to the tying market, the market for MIST Surgical Robots, I have concluded that the relevant antitrust geographic market was the United States. I discuss the evidence that supports the basis for this conclusion in more detail below.

50. The U.S. Food & Drug Administration ("FDA") is "responsible for protecting the public health by ensuring the safety, efficacy, and security of human and veterinary drugs, biological products, and medical devices."[123] The FDA states the following

---

[119] DeSantis Deposition at 64:6-12.
[120] Vavoso Deposition at 102:7-106:6, 112:6-18.
[121] Intuitive-00124485-87 at 85.
[122] For example, Bob DeSantis of Intuitive testified that neither the Stryker Mako orthopedic robot nor the Johnson & Johnson endoluminal platform perform minimally invasive soft tissue surgeries. See DeSantis Deposition at 32:3-33:10.
[123] FDA, "What We Do." Available at: https://www.fda.gov/about-fda/what-we-do.

regarding the sale of medical devices (such as robotically assisted surgical devices): "In the U.S., FDA regulates the sale of medical device products. Before a medical device can be legally sold in the U.S., the person or company that wants to sell the device must seek approval from the FDA. To gain approval, they must present evidence that the device is reasonably safe and effective for a particular use."[124] In its 2021 Form 10-K, Intuitive states: "The FDA regulates the development, design, non-clinical and clinical research, manufacturing, safety, efficacy, labeling, packaging, storage, installation, recordkeeping, complaint and adverse event reporting, clearance, approval, certification, promotion, marketing, export, import distribution, and service of medical devices in the U.S. to ensure that medical devices distributed domestically are safe and effective for their intended uses."[125] Thus, if a medical device, such as a surgical robot, does not have FDA clearance, it cannot be used for surgery in the United States. As Glenn Vavoso of Intuitive testified:

> Q. For a robot to be used for a surgery in the United States, it needs to have FDA approval for the procedure it's being used for, right? [...]
>
> A. Yes.
>
> Q. So to the extent that there's robots for surgeries that exist outside of the United States, those can't be used for surgeries inside the United States, right?
>
> A. Without FDA approval, correct.[126]

Thus, the fact that the sale of MIST Surgical Robots is regulated by the United States government, and that manufacturers outside of the United States cannot sell MIST Surgical Robots to hospitals in the United States without approval from the United States government, constitutes evidence demonstrating that the relevant antitrust geographic market is the United States.

51. The evidence discussed above demonstrates that the market for MIST Surgical Robots in the United States, the tying market in this matter, constitutes a relevant antitrust

---

[124] FDA, "FDA's Role in Regulating Medical Devices" (hereafter "FDA's Role in Regulating Medical Devices"). Available at: https://www.fda.gov/medical-devices/home-use-devices/fdas-role-regulating-medical-devices.
[125] Intuitive 2021 SEC Form 10-K at p. 15.
[126] Vavoso Deposition at 109:20-110:12.

market. In the next section of the Expert Report, I discuss how the EndoWrist Repair and Replacement Market in the United States, the tied market in the matter, also constitutes a distinct relevant antitrust market.

IV. The EndoWrist Repair and Replacement Market in the United States Constitutes a Relevant Antitrust Market

52. In the previous section I discussed evidence demonstrating that the tying market, the market for MIST Surgical Robots in the United States, constitutes a relevant antitrust market. As part of my analysis of Plaintiff's allegations in this matter, I also analyze the relevant antitrust market with respect to the tied market, which Plaintiff alleges was unlawfully tied to Intuitive's sales of da Vinci surgical robots. Based on my analysis of the documents and data produced in this litigation, as well as my training and experience in economics and my research and analysis into the market for the repair and replacement of EndoWrist surgical instruments, I have concluded that the EndoWrist Repair and Replacement Market constitutes a relevant antitrust product market that is distinct from the market for MIST Surgical Robots. I have also concluded that the United States constitutes the relevant antitrust geographic market with respect to the tied market for evaluating the impact of the Alleged Misconduct. I discuss my bases for these conclusions below.

A. The EndoWrist Repair and Replacement Market is a Relevant Antitrust Product Market

53. As I noted above, a relevant antitrust product market is comprised of the smallest possible set of goods for which a hypothetical monopolist could exercise market power to raise prices on that set of products by a small, but significant, amount without losing so much in sales volume that the increase in price is unprofitable.[127] Based on my research and analysis into the EndoWrist Repair and Replacement Market, and my training and experience in economics, I have determined that the EndoWrist Repair and Replacement

[127] As I explained, in general, an economic analysis of the relevant antitrust product market requires identifying "products that are close demand or supply substitutes." See Carlton and Perloff at p. 670. "Product B is a *demand substitute* for A if an increase in the price of A causes consumers to use more B instead. Product B is a *supply substitute* for A if, in response to an increase in the price of A, firms that are producing B switch some of their production facilities to the production of A." See Carlton and Perloff at p. 670 (emphasis in original). See, also, Horizontal Merger Guidelines at § 4.

Market constitutes a relevant antitrust product market. I base this conclusion on the fact that there are no functional substitutes for the repair and replacement of EndoWrist surgical instruments. Therefore, given that there are no functional substitutes for the repair and replacement of EndoWrist surgical instruments in the applications for which it is sold, it is not possible for there to be economic substitutes for the repair and replacement of EndoWrist surgical instruments. I discuss the evidence that forms the basis of this conclusion in greater detail below.

i. Third-Party Repairs of EndoWrist Surgical Instruments are Part of the Same Relevant Antitrust Product Market as Replacement EndoWrist Surgical Instruments Sold by Intuitive

54. Evidence I have reviewed demonstrates that third-party repairs of EndoWrist surgical instruments (such as those performed by SIS) were viewed by Intuitive and other market participants and analysts as a competitive threat to Intuitive's sales of replacement EndoWrist surgical instruments. For example, Deutsche Bank published an analyst report in February 2020 covering the "third party risk" to Intuitive's Instruments & Accessories business segment (which includes the sale of EndoWrist instruments) following a recent downgrade of Intuitive's stock in which it concluded:

> We believe the Street continues to be overly dismissive of the risk of increasing usage of refurbished da Vinci instruments to Intuitive's top line over the next couple years. Given the abundance of first-hand confirmation from hospital customers that are exploring refurbished instruments, the question is not whether – but rather, how much – Intuitive's business will be impacted.[128]

55. Deutsche Bank further noted that, based on its research, "FDA action to stymie usage of repaired instruments is highly unlikely," and that Intuitive's justification of its cease-and-desist letters to enforce its service agreements on "safety, regulatory, and

[128] DeSantis Deposition Exhibit 11 at Intuitive-00566055. Regarding how hospitals have been dealing with Intuitive's "pushback strategy" via its "advisement to cease and desist engagement with service providers," Deutsche Bank concluded: "Notably, some hospitals are now beginning to push back on restrictions embedded in their service contracts against third party servicing of da Vinci systems and instruments, questioning the legality and enforceability of such terms of service." See DeSantis Deposition Exhibit 11 at Intuitive-00566055. Deutsche Bank also identified the third-party repair of EndoWrist surgical instruments as a "competitive threat" to Intuitive's U.S. Instruments and Accessories business. See Intuitive-00552993-53014 at 52993.

legal/contractual grounds" are largely irrelevant.[129] Furthermore, Deutsche Bank estimated that, once repairs of EndoWrist instruments used with model X/Xi da Vinci robots become available, "Intuitive's top line exposure will increase dramatically – rendering a majority (~58%) of segment sales 'at risk' of competitive pressures."[130]

56. Evidence I have reviewed demonstrates that Intuitive itself acknowledged that third-party repairs of EndoWrist surgical instruments (such as those performed by SIS) were a competitive threat to its sales of replacement EndoWrist surgical instruments. At deposition, Katie Scoville, Director of New Product Verification, Packaging, and Product Labeling at Intuitive, testified that the threat of "third-party EndoWrist refurbishers" would "be a factor in our sales numbers for certain third parties."[131]

57. In a September 2016 internal analysis, Intuitive acknowledged the competitive threat from one such third-party repair company (Rebotix): "Despite the strong technology protections that ISI uses to limit the life of its instruments, there are companies that will attempt to hack that technology and extend instrument life beyond ISI's specs. There is already one company in Florida (Rebotix) that claims to be able to extend instrument life and is currently attempting to qualify for a CE mark for the life-extended instruments."[132] In an internal analysis of options for pursuing a "Remanufactured Instruments" program, Intuitive notes as one of the "Pros" of one option that "Rebotix has potential to impact Si sales, an immediate threat."[133] In an August 2019 analysis of third-party repairs of EndoWrist surgical instruments, Intuitive identified a number of third-party repairers as a competitive threat to their business, and also summarized "rebuttals" to Intuitive's value proposition pertaining to one specific third-party repairer (Rebotix), as well as various responses to those rebuttals.[134]

---

[129] DeSantis Deposition Exhibit 11 at Intuitive-00566057-066. See, also, Intuitive-00552993-53014 at 52997-52998.
[130] DeSantis Deposition Exhibit 11 at Intuitive-00566072. See, also, Intuitive-00552993-53014 at 53006.
[131] Deposition of Katie Scoville, May 26, 2021 (hereafter "Scoville Deposition") at 76:19-25. Ms. Scoville also testified that Intuitive "likely discussed revenue implications of third-party refurbishment." See Scoville Deposition at 76:1-18.
[132] Intuitive-00102938-989 at 952.
[133] Intuitive-00139149-150 at 150.
[134] Intuitive-00194074-089.

58. Relatedly, in November 2019, executives at Intuitive discussed the competitive threat posed by SIS upon learning that Marin General Hospital had been using EndoWrist instruments that had been repaired by SIS.[135] In reporting this finding, Erin Grinberg of Intuitive noted that Marin General Hospital was "very proud of this and celebrated the cost savings."[136] In devising a plan for how to respond to the competitive threat posed by SIS at Marin General Hospital,[137] Dan Jones of Intuitive noted that "[t]here is a close match between the 'SIS' materials and the documents we'd seen earlier from Rebotix."[138] Similarly, in September 2019, Intuitive executives discussed how to deal with an inquiry from University of Florida Health Shands ("UF Shands") regarding the use of SIS's services to save money by repairing its EndoWrist instruments.[139] UF Shands had been alerted to the cost savings by its Group Purchasing Organization, which noted:

> Two of [its] members, Kaiser Permanente and Legacy Health System are capturing savings by using Intuitive Surgical Endowrist refurbishment products. Surgical Instrument Service Company (SIS) is now the only supplier providing refurbishment to Intuitive Surgical's da Vinci EndoWrist.[140]

---

[135] Intuitive-00049108-112.
[136] Intuitive-00049108-112 at 112.
[137] As part of this response, Adam Clark of Intuitive noted that it was "important for MG to understand that we will be canceling their SLSA in short order if this keeps happening." See Intuitive-00110473-0478 at 74.
[138] Intuitive-00049108-112 at 108. Evidence I have reviewed indicates that SIS itself did not perform repairs on EndoWrist instruments on behalf of its hospital customers; rather, it acted as a distributor of such repair services performed by other third-party repairers. See, for example, 30(b)(6) Deposition of Greg Posdal, November 1, 2022 (hereafter "30(b)(6) Posdal Deposition") at 21:16-22:12, 47:4-50:14. Chris Gibson of Rebotix described Rebotix's relationship with SIS in the following way: "SIS has been a longtime customer of Benjamin Biomedical. And as I discussed before, that we utilized our distributor base of Benjamin Biomedical to offer the repair service that Rebotix Repairs was offering, and so we engaged SIS to begin selling the Rebotix Repair repair process and service to their customers, which are the end-user hospitals." See Deposition of Chris Gibson, June 22, 2021 at 158:1-9. Similarly, as Greg Posdal of SIS testified regarding Rebotix: "they actually performed the work for us. We picked it up, sent it to them, and they did the repairs." See Deposition of Greg Posdal, May 10, 2021 (hereafter "Posdal Deposition") at 30:17-31:10. Thus, the evidence discussed throughout this Expert Report regarding how Intuitive's exclusionary conduct prevented Rebotix from competing effectively in the EndoWrist Repair and Replacement Market is also applicable to SIS's efforts to compete effectively in the EndoWrist Repair and Replacement Market. See, for example, 30(b)(6) Deposition of Keith Robert Johnson, October 27, 2022 (hereafter "Johnson Deposition") at 17:22-20:1.
[139] Intuitive-00110252-54.
[140] Intuitive-00110252-54 at 54. UF Shands was further informed that Kaiser Permanente and Legacy Health system achieved an approximately 40 percent savings by having SIS repair EndoWrist instruments. See Intuitive-00110252-54 at 54.

59. The evidence discussed above demonstrates that third-party repairs of EndoWrist surgical instruments were viewed as a competitive threat to Intuitive's sales of replacement EndoWrist surgical instruments. This constitutes one piece of evidence demonstrating that third-party repairs of EndoWrist surgical instruments are part of the same relevant antitrust product market as replacement EndoWrist surgical instruments sold by Intuitive.

ii. Intuitive Considered Selling Refurbished Endowrist Instruments to Make it More Difficult for Third-Party Repair Companies To Compete Effectively in the EndoWrist Repair and Replacement Market

60. Evidence I have reviewed in the form of Intuitive's own conduct in response to the competitive threat posed by third-party repairs of EndoWrist surgical instruments provides additional evidence that third-party repairs of EndoWrist surgical instruments are part of the same relevant antitrust product market as replacement EndoWrist surgical instruments sold by Intuitive. For example, evidence demonstrates that, in response to the growing competitive threat from lower priced third-party repairers of EndoWrist surgical instruments, Intuitive investigated the possibility of selling refurbished EndoWrist surgical instruments at a discount off of the cost of replacement EndoWrists. For example, beginning in 2017, Intuitive began exploring the possibility of offering refurbished EndoWrist surgical instruments to some hospitals at a discount off of its new, replacement EndoWrist surgical instruments.[141] In a January 2017 presentation, Intuitive described the program, often referred to internally as Project Dragon, in the following way: "Collection of expired *EndoWrist* Instruments at the hospital, return to Intuitive Surgical, and receive a refurbished instrument at a lower cost compared to new."[142] The "Economic Benefits" of the proposed program included "[r]educed per procedure cost;" "[c]ost flexibility options to the surgeon and hospital;" and "[r]educe[d] cost of disposable at the hospital."[143]

[141] DeSantis Deposition at 226:23-227:4, Exhibit 33.
[142] DeSantis Deposition Exhibit 33 at Intuitive-00042945 (emphasis in original).
[143] DeSantis Deposition Exhibit 33 at Intuitive-00042946. See, also, DeSantis Deposition Exhibit 38 at Intuitive-00273265.

61. In a May 2017 internal marketing team update regarding Project Dragon, Intuitive included several "[d]efensive revenue and margin protection" "Company Objectives" for the project, including: "Displace non-validated 3rd party re-programmers where already present," as well as "increase entry barriers for other 3rd party re-programmers."[144] At deposition, Katie Scoville, Director of New Product Verification, Packaging, and Product Labeling at Intuitive, acknowledged that it was one of Intuitive's "goals" as part of Project Dragon to "displace nonvalidated third-party reprogrammers where already present."[145] Ms. Scoville also testified that one "side effect" of Project Dragon was the creation of "entry barriers for third-party reprogrammers," and that such a "side effect" would be "advantageous [to Intuitive] to increase entry barriers."[146] In a 2017 internal presentation analyzing the "Benefits of Secondary Markets" for EndoWrist surgical instruments for both Intuitive and users (hospitals), Intuitive noted that "[m]arket data shows that remanufacturing is only 5% of a given [Instrument & Accessories] market segment," and therefore if "only 5% of accounts are interested in Dragon then 95% of accounts remain exposed to third party collection companies."[147]

62. Evidence indicates that in August 2017, Intuitive initially decided not to pursue Project Dragon and offer refurbished EndoWrist surgical instruments to hospitals at a lower cost than replacement EndoWrist surgical instruments.[148] I discuss Intuitive's decision not to pursue its refurbished EndoWrist instrument program in greater detail later in this Expert Report.

63. The evidence discussed above demonstrates that third-party repairs of EndoWrist surgical instruments are part of the same relevant antitrust product market as replacement EndoWrist surgical instruments sold by Intuitive. In the next section I discuss evidence

---

[144] DeSantis Deposition Exhibit 37 at Intuitive-00273261. At deposition, Bob DeSantis of Intuitive acknowledged that offering refurbished EndoWrist surgical instruments would allow Intuitive to compete with, and "increase entry barriers for third-party re-programmers." See DeSantis Deposition at 254:19-24.
[145] Scoville Deposition at 85:10-23, Exhibit 6 at Intuitive-00273267.
[146] Scoville Deposition at 86:18-87:24, Exhibit 6 at Intuitive-00273267.
[147] DeSantis Deposition Exhibit 38 at Intuitive-00273269.
[148] Intuitive-00601672-75 at 72. Project Dragon ultimately ended in the second quarter of 2020, and Intuitive is not actively pursuing the possibility of offering refurbished EndoWrist surgical instruments to hospitals at a lower cost than replacement EndoWrist surgical instruments. See Scoville Deposition at 12:11-13:15, 91:24-92:3. See, also, Individual & 30(b)(6) Deposition of Nicky Goodson, October 27, 2022 (hereafter "Goodson Deposition") at 72:5-74:3.

demonstrating that there are no functional substitutes for the repair and replacement of EndoWrist surgical instruments, thus further demonstrating that the EndoWrist Repair and Replacement Market constitutes a relevant antitrust product market.

iii. Neither Traditional Laparoscopic Surgical Instruments, nor Surgical Instruments Used with Any Other Non-MIST Surgical Robots, are Compatible with Da Vinci Surgical Robots

64. Another form of evidence demonstrating that the EndoWrist Repair and Replacement Market constitutes a relevant antitrust product market is the fact that neither traditional laparoscopic surgical instruments, nor surgical instruments used with any other non-MIST Surgical Robots, are compatible with da Vinci surgical robots. First off, evidence I have reviewed indicates that all of Intuitive's EndoWrist surgical instruments have been approved by the FDA for use with a da Vinci surgical robot in a MIST surgical procedure.[149] However, evidence indicates that no other manufacturers sell FDA-approved surgical instruments for use with a da Vinci surgical robot in a MIST surgical procedure. For example, Bob DeSantis of Intuitive testified that there was no other "manufacturer in the United States that sells instruments that can be attached to the da Vinci robot and used for minimally invasive surgery."[150] Similarly, Glenn Vavoso, Senior Vice President and General Manager for Asia and Indirect Global markets at Intuitive, testified that there are no other companies other than Intuitive from which hospitals that own a da Vinci surgical robot can purchase surgical instruments that work with a da Vinci surgical robot.[151]

65. Furthermore, evidence I have reviewed demonstrates that Intuitive specifically designed its da Vinci surgical robots to only work with its own EndoWrist surgical instruments and, thus, no other surgical instruments (such as traditional laparoscopic surgical instruments) could be used in a da Vinci MIST surgical procedure in place of EndoWrist surgical instruments.[152] Mr. DeSantis testified:

---

[149] See, for example, Intuitive-00552993-53014 at 52998.
[150] DeSantis Deposition at 25:1-19.
[151] Vavoso Deposition at 57:17-59:14, 244:7-10.
[152] In its 2004 Form 10-K, Intuitive described its EndoWrist surgical instruments as "'smart disposables' because they are resterilizable and reusable for a defined number of procedures. A custom computer chip inside each instrument performs several functions that help determine how the system and instruments

> Q. [...] Is it your understanding that Intuitive designed the da Vinci robots to only function with instruments that are produced by Intuitive?
>
> A. Yes.
>
> Q. And that was an intentional design decision; right?
>
> A. Absolutely.[153]

Mr. DeSantis also noted that the portfolio of patents Intuitive holds regarding the development of surgical instruments for use with the da Vinci surgical robot would make it difficult for another company to manufacture surgical instruments that would be compatible (and work "cleanly") with the da Vinci surgical robot.[154]

66. Furthermore, additional evidence I have reviewed demonstrates that traditional laparoscopic surgical instruments cannot be attached to a da Vinci surgical robot for use in a MIST surgical procedure. For example, at deposition, Bob DeSantis of Intuitive testified that neither traditional laparoscopic surgical instruments, nor surgical instruments designed for other surgical robots, can be attached to the da Vinci surgical robot.[155] Glenn Vavoso of Intuitive similarly testified that traditional laparoscopic surgical instruments cannot be attached to the da Vinci surgical robot for use in a MIST robotic surgery.[156] Since traditional laparoscopic surgical instruments cannot be attached to a da Vinci surgical robot for use in a MIST surgical procedure, they are therefore not a functional substitute for the repair and replacement of EndoWrist surgical instruments for use in MIST robotic surgeries.

67. The evidence discussed above demonstrates that there are no viable surgical instrument alternatives to the repair and replacement of EndoWrist surgical instruments for use with the da Vinci surgical robot. Given that traditional laparoscopic surgical

---

work together. When an *EndoWrist* instrument is attached to an arm of the patient-side cart, the chip performs an 'electronic handshake' that ensures the instrument was manufactured by us and recognizes the type and function of the instrument and number of past uses. For example, the chip distinguishes between scissors and a scalpel and controls the unique functions of different instruments as appropriate. In addition, the chip will not allow the instrument to be used for more than the prescribed number of procedures so that its performance meets specifications during each procedure." See Intuitive Surgical, Inc., SEC Form 10-K, filed March 16, 2005 at p. 7.

[153] DeSantis Deposition at 23:21-24:4. See, also, DeSantis Deposition at 27:5-8.

[154] DeSantis Deposition at 25:20-27:4.

[155] DeSantis Deposition at 139:22-140:9.

[156] Vavoso Deposition at 53:17-55:16.

instruments, as well as surgical instruments used with any other non-MIST Surgical Robots, are not functional substitutes for the repair and replacement of EndoWrist surgical instruments, they therefore are not economic substitutes for the repair and replacement of EndoWrist surgical instruments either. This is, therefore, another form of evidence demonstrating that the tied market (the EndoWrist Repair and Replacement Market) constitutes a relevant antitrust product market.

B. The Relevant Antitrust Geographic Market with Regards to the Tied Market is the United States

68. As part of my analysis of Plaintiff's claims with respect to the tied market, EndoWrist Repair and Replacement Market, I have concluded that the relevant antitrust geographic market was the United States. I discuss the evidence that supports the basis for this conclusion in more detail below.

69. Evidence I have reviewed indicates that Intuitive's EndoWrist surgical instruments are classified as Class II medical devices.[157] According to Intuitive, "Class II medical devices are those which are subject to general controls, and most require premarket demonstration of adherence to certain performance standards or other special controls, as specified by the FDA, and special controls as deemed necessary by the FDA to ensure the safety and effectiveness of the device."[158] Thus, the fact that the sale of EndoWrist surgical instruments is regulated by the United States government constitutes evidence demonstrating that the relevant antitrust geographic market with regards to the tied market is the United States. Further, while third-party repairs of EndoWrist surgical instruments (such as those performed by SIS) do not require approval from the FDA,[159] evidence indicates that these third-party repairers operate on a national basis. For example, one market research report I have reviewed noted that, as "a service industry, the Medical Equipment Repair and Maintenance Services industry does not participate in

[157] Intuitive 2021 SEC Form 10-K at p. 15.
[158] Intuitive 2021 SEC Form 10-K at p. 15. Intuitive also noted that its "current products are subject to premarket notification and clearance under section 510(k) of the FFDCA." See Intuitive 2021 SEC Form 10-K at p. 15.
[159] Scoville Deposition at 51:25-53:3; DeSantis Deposition Exhibit 11 at Intuitive-00566055, 6057, 6059, 6064-6065; Deposition of Bob Overmars, June 15, 2021 (hereafter "Overmars Deposition") at 96:9-97:3.

international trade."[160] Consistent with this, evidence indicates that SIS is a "national company" that works with hospitals in the U.S.[161] Thus, the fact that third-party repairers of EndoWrist surgical instruments operated on a national basis is further evidence that the relevant antitrust geographic market with respect to the tied market is the United States.

C. *The EndoWrist Repair and Replacement Market is Distinct from the Market for MIST Surgical Robots*

70. Earlier in this Expert Report I discussed evidence demonstrating that the tied market (the EndoWrist Repair and Replacement Market) and the tying market (the market for MIST Surgical Robots) each constitute relevant antitrust product markets. Additional evidence I have reviewed demonstrates that MIST Surgical Robots and EndoWrist surgical instruments are separate, distinct products that are inputs into the same product. Thus, the EndoWrist Repair and Replacement Market is distinct from the market for MIST Surgical Robots.

71. In the context of a tying arrangement, courts have held that products are considered distinct if there is sufficient demand for the tied product separate from the tying product.[162] Evidence I have reviewed demonstrates that hospital demand for EndoWrist surgical instruments is separate and distinct from demand for da Vinci surgical robots. For example, after a hospital first purchases a da Vinci surgical robot, it must then continue to purchase EndoWrist surgical instruments on a recurring basis in order to use its new da Vinci surgical robot.[163] After a hospital has made the decision to purchase a da Vinci surgical robot, it then makes distinct, separate decisions on the replacement (or repair) of EndoWrist surgical instrument purchases, including how many EndoWrists to buy and what type of EndoWrists to buy, and, in a world free of Intuitive's anticompetitive conduct, whether to repair or replace those surgical instruments. Ongoing purchases of EndoWrists are distinct from the purchase of the da Vinci surgical

---

[160] Jack Curran, "Medical Equipment Repair & Maintenance Services," *IBISWorld*, June 2020 at p. 23.
[161] See, for example, 30(b)(6) Johnson Deposition at 32:16-33:8.
[162] U.S. Supreme Court, *Jefferson Parish Hospital District No. 2 et al. v. Hyde*, 466 U.S., No. 82-1031, March 27, 1984 (hereafter "Jefferson Parish").
[163] Vavoso Deposition at 50:20-51:2.

robot; a hospital does not buy a new MIST Surgical Robot for each surgical procedure, for every ten surgical procedures,[164] or every time it replaces or repairs the EndoWrist surgical instruments used in those surgeries.[165] And, as I discuss in greater detail below, depending on the types of surgeries typically performed at a given hospital, hospitals will have demand that covers different mixes of EndoWrist surgical instruments.

72. Further, to determine whether there is sufficient demand for the tied product that is distinct from demand for the tying products, courts have looked to actual market practices outside of the tying arrangement to determine if customers exhibited a preference for purchasing the tied product separately from the tying product.[166] Later in this Expert Report I discuss extensive evidence demonstrating that, absent Intuitive's tying of the purchase of da Vinci robots from Intuitive to the purchase of replacement EndoWrist surgical instruments exclusively from Intuitive, at least some hospitals would have preferred having their EndoWrist surgical instruments repaired by third-party repairers (such as SIS) at a lower cost than purchasing replacement EndoWrist surgical instruments from Intuitive. For example, regarding the repair services of another third-party repairer similar to SIS (Rebotix), Edward Harrich of Pullman Regional Hospital testified:

> Q. If it weren't for Intuitive's contractual limitations, would your hospital use Rebotix's services to the full extent that Rebotix was willing to provide them?
>
> A. Yes.[167]

73. Additional evidence that I have reviewed demonstrating that MIST Surgical Robots and EndoWrist surgical instruments are distinct products includes the fact that these products are not typically sold in fixed proportions. Rather, hospital demand for the two products is distinct. For example, after purchasing a da Vinci surgical robot, hospitals' continued purchases of EndoWrist surgical instruments are not made in fixed

---

[164] Evidence indicates that EndoWrist surgical instruments are typically designed to have ten uses before expiration. See, for example, DeSantis Deposition at 137:20-138:6; Intuitive 2021 SEC Form 10-K at pp. 8, 58. I understand that in October 2020, Intuitive introduced its Extended Use Program that allowed select da Vinci Xi and da Vinci X EndoWrist surgical instruments to be used twelve to 18 times, as compared to the typical ten uses. See Intuitive 2021 SEC Form 10-K at pp. 8, 58.
[165] Vavoso Deposition at 51:3-51:9.
[166] Jefferson Parish.
[167] Harrich Deposition at 62:6-10.

proportion to the da Vinci surgical robots it purchases; rather, its continued EndoWrist surgical instrument purchases will be based on the frequency at which it uses its da Vinci surgical robot, or the frequency at which it uses certain types of EndoWrist surgical instruments as compared to other types of EndoWrist surgical instruments.[168] Therefore, the fact that hospitals do not purchase MIST Surgical Robots (such as Intuitive's da Vinci) and EndoWrist surgical instruments in fixed proportions (rather, hospital demand for these products is distinct from one another) constitutes one piece of evidence demonstrating that the EndoWrist Repair and Replacement Market is distinct from the market for MIST Surgical Robots.

74. In addition to this evidence, Intuitive itself identifies its da Vinci surgical robots and its EndoWrist surgical instruments as separate products that it offers to customers. For instance, one of the "Products" categorizations Intuitive identifies in its 2021 Form 10-K is "da Vinci Surgical systems."[169] The sub-categories Intuitive lists under its da Vinci Surgical Systems product category include: Surgeon's Console, Patient-Side Cart, 3DHD Vision System, Firefly Fluorescence Imaging, and da Vinci Xi Integrated Table Motion.[170] Notably, Intuitive does not include its EndoWrist surgical instruments under the same product category as its da Vinci surgical robot; rather, Intuitive lists its EndoWrist surgical instruments under its "Instruments and Accessories" product category.[171] Intuitive recognizes that the EndoWrist surgical instruments used in combination with its da Vinci surgical robots are not part of the same product as the da Vinci surgical robot.

75. Further to this point, I have noted that, in its financial statements, Intuitive categorizes and reports revenue for its da Vinci surgical robots and EndoWrist surgical instruments separately.[172] This is consistent with the fact that the revenue streams earned by Intuitive for these products are distinct. For example, as Intuitive noted in its 2021

---

[168] For example, a hospital that specializes in Mitral Valve Repair may purchase Valve Hook at a high frequency, whereas a hospital that specializes in Nephrectomy may purchase Dual Blade Retractor. See Intuitive Surgical, "EndoWrist/Single-Site Instrument & Accessory Catalog," May 2014 at p. 3. Available at: https://www.intuitivesurgical.com/products/871145_Instrument_Accessory_%20Catalog.pdf.
[169] Intuitive 2021 SEC Form 10-K at p. 6.
[170] Intuitive 2021 SEC Form 10-K at pp. 6-7.
[171] Intuitive 2021 SEC Form 10-K at pp. 7-8.
[172] See, for example, Intuitive 2021 SEC Form 10-K at pp. 68-70.

Form 10-K, the majority of da Vinci surgical robots are sold via sales arrangements with hospitals where "revenue is recognized up-front," and "represents a significant capital equipment investment for [its] customers when purchased."[173] Conversely, EndoWrist surgical instruments generate a "recurring revenue" stream for Intuitive since these surgical instruments "have limited lives and will either expire or wear out as they are used in surgery, at which point they need to be replaced," leading "customers [to] place orders to replenish their supplies of instruments and accessories on a regular basis."[174] Thus, the fact that hospitals' purchases of da Vinci surgical robots represent a large capital investment for hospitals, while their required recurring purchases of EndoWrist surgical instruments represent an ongoing operating expense, is further indicative that MIST Surgical Robots (such as Intuitive's da Vinci) and EndoWrist surgical instruments are not part of the same relevant antitrust product market.

76. Furthermore, Intuitive acknowledges the differences in the sales cycles it engages in with hospitals when selling da Vinci surgical robots and EndoWrist surgical instruments. For example, Intuitive notes that the "initial system sale into an account is a major capital equipment purchase by our customers and typically has a lengthy sales cycle that can be affected by macroeconomic factors, capital spending prioritization, timing of budgeting cycles, and competitive bidding processes."[175] However, hospitals' required purchases of the EndoWrist surgical instruments that complement their da Vinci surgical robots are made on a "regular basis" as per the terms of the sales agreement they sign at the time they purchase their da Vinci surgical robot, and "[o]rders received are typically shipped within one business day."[176]

---

[173] Intuitive 2021 SEC Form 10-K at p. 58.
[174] Intuitive 2021 SEC Form 10-K at pp. 13, 58-59. Intuitive noted that a "large portion of our revenue is generated through our sales of instruments and accessories." See 2021 Intuitive SEC Form 10-K at p. 35. In the U.S. in 2021, Intuitive's Instruments and Accessories products (which includes EndoWrist surgical instruments) accounted for approximately 58 percent of Intuitive's overall revenue. See 2021 Intuitive SEC Form 10-K at p. 102. I understand that approximately one third of da Vinci surgical robots are sold to hospitals in operating lease transactions where revenue is recognized over time and for some of these lease agreements, customers are "provided with the right to purchase the leased system at certain points during and/or at the end of the lease term." Intuitive 2021 SEC Form 10-K at pp. 57-60, 69.
[175] Intuitive 2021 SEC Form 10-K at p. 13.
[176] Intuitive 2021 SEC Form 10-K at p. 13.

77. The evidence discussed above demonstrates that MIST Surgical Robots and EndoWrist surgical instruments are separate, distinct products, and that the EndoWrist Repair and Replacement Market is distinct from the market for MIST Surgical Robots.

V. Evidence Demonstrates that the Alleged Misconduct was Anticompetitive

78. As I discussed above, I understand Plaintiff alleges that "Intuitive has gone to extraordinary efforts to leverage its monopoly power in robots for use in minimally invasive soft tissue surgery, the repair and support of those robotic systems, and its monopoly power in instruments for use with such robots to foreclose aftermarket repair of those instruments by any competitors," and that an "effect of Intuitive's anticompetitive conduct is to generate and sustain unreasonably high, supra-competitive prices for aftermarket EndoWrist instruments."[177] I understand one aspect of Defendant's alleged anticompetitive conduct in this regard includes a standard sales and service agreement that Intuitive required all purchasers of its da Vinci surgical robots to agree to that both expressly "demands that customers further agree to a limited license for the use of EndoWrist instruments," which "expires once an EndoWrist instrument is used up to its maximum number of uses as specified in the documentation accompanying the particular instrument,"[178] and "prohibits customers from engaging any unauthorized third party to repair, refurbish, or recondition EndoWrist instruments, whether before or after the limited use license has expired."[179] I further understand that Plaintiff alleges that, as part of its alleged misconduct, Intuitive routinely "sent letters to and had in-person conversations with SIS's customers or potential customers, knowing that they were under

---

[177] Complaint at ¶87, 110. "Intuitive leverages its market power in the worldwide and domestic markets for the sale of surgical robots used in minimally invasive soft tissue surgery, and the market for repair services for their robots, to pressure customers to use supra-competitively priced replacement EndoWrist parts." See Complaint at ¶65.

[178] Complaint at ¶4. I understand Plaintiff alleges that "EndoWrists also include an internal memory chip" which "counts the number of times the EndoWrist is attached to a da Vinci robot arm, not an actual measure of usage such as usage time, number of movements, or actuation time." See Complaint at ¶¶30-31. Further, I understand that Plaintiff alleges that the "da Vinci robot system queries the memory chip prior to performing any operations with the particular EndoWrist instrument. After a certain number of uses, usually limited to ten, the EndoWrist instrument is rendered non-operational, based solely on the number of times it is attached to the da Vinci robot arm, without any regard to the actual underlying physical condition of the EndoWrist instrument. Without the services of providers such as SIS, the hospital has no choice but to buy a brand-new replacement EndoWrist instrument from Intuitive at full price." See Complaint at ¶32.

[179] Complaint at ¶4.

contract or in contractual negotiations for repaired EndoWrists. As a result of the threats and misleading statements in those letters and conversations, all of SIS's EndoWrists customers backed out of their contracts or did not sign contracts under negotiation, effectively eviscerating SIS's EndoWrist repair business."[180] Based on my analysis of the documents and data produced in this litigation, as well as my training and experience in economics and my research and analysis into the relevant antitrust markets at issue here, I have concluded that Intuitive's Alleged Misconduct was anticompetitive because it resulted in higher prices for products in the (tied) market than otherwise would have prevailed.

79. According to one standard textbook on antitrust, exclusionary conduct on the part of a firm (such as the kind being alleged by Plaintiff in this matter) is considered to be anticompetitive if (i) the firm maintains significant monopoly power (such as Plaintiffs allege Intuitive did in the tying market, the market for MIST Surgical Robots); (ii) the exclusionary conduct limits potential new entry and effective competition from significant rivals (as Plaintiffs allege was the case here in that SIS was forestalled from competing effectively in the tied market, the EndoWrist Repair and Replacement Market); and (iii) the exclusionary conduct results in lower market output to customers, or higher prices paid by customers (as Plaintiffs allege was the case here in that hospitals paid more to replace their EndoWrist instruments than they otherwise would have had the option to repair those instruments through third-party repairers such as SIS been available to them).[181] Evidence I have reviewed demonstrates that Intuitive's Alleged Misconduct

---

[180] Complaint at ¶92. "Intuitive's letters make its threats explicit—if the hospital uses repaired instruments, Intuitive will render its surgical robot inoperable. Not only will Intuitive seek damages or indemnity from its customer, but if Intuitive discovers 'Systems being used with instruments by an unauthorized third party, Intuitive may no longer accept your service calls for such Systems.' Because Intuitive also refuses to allow any competition in the market for service of its robots, and refuses to make error codes and other critical information available to third parties, failure to provide such service will render a robot that originally cost well over a million dollars inoperable. Many hospitals have multiple such robots that would thus be rendered inoperable. [...] Again, the threat is explicit—if the hospital uses refurbished instruments, Intuitive will render its surgical robot inoperable." See Complaint at ¶¶102-103. Further, in "private conversations, Intuitive representatives have made this threat even more explicit. In response to one hospital's use of third-party repair services, an Intuitive representative stated that Intuitive would turn the surgical robot into a 'paperweight.'" See Complaint at ¶104.

[181] Herbert Hovenkamp, *The Antitrust Enterprise*, Cambridge, MA: Harvard University Press, 2005 (hereafter "Hovenkamp, The Antitrust Enterprise") at p. 206. The DOJ stated the following regarding circumstances in which exclusive dealing can be considered anticompetitive: "exclusive dealing may allow one manufacturer, in effect, to monopolize efficient distribution services and thereby prevent its rivals from

was anticompetitive. I discuss the evidence that forms the bases for this opinion in more detail below.

A. Intuitive Posessed Monopoly Power in the Market for MIST Surgical Robots in the United States During the Relevant Period

80. As I previously discussed, the first step in determining whether exclusionary conduct on the part of a given firm is anticompetitive is whether that firm maintains significant monopoly power.[182] "Monopoly power" refers to the ability of a single firm to persistently charge a price that is significantly higher than the competitive price. [183] Although the existence of monopoly power is not, by itself, anticompetitive, a firm that engages in exclusionary conduct in an attempt to maintain monopoly power inhibits the competitive process and harms competition. According to the DOJ:

> Monopoly power is conventionally demonstrated by showing that both (1) the firm has (or in the case of attempted monopolization, has a dangerous probability of attaining) a high share of a relevant market and (2) there are entry barriers – perhaps ones created by the firm's conduct itself – that permit the firm to exercise substantial market power for an appreciable period.[184]

81. In the present matter, Plaintiff alleges that Intuitive used its monopoly power in the market for MIST Surgical Robots to foreclose competition in the EndoWrist Repair and Replacement Market by tying the purchase of da Vinci robots from Intuitive to the purchase of replacement EndoWrist surgical instruments exclusively from Intuitive, thus preventing customers from repairing their EndoWrist surgical instruments through companies such as SIS at a lower cost. Economists typically define the tying of products as occurring when a seller sells a product under the condition that a buyer also purchase a second (tied) product.[185] As Judge Richard Posner described, "the traditional objection to

---

competing effectively. […] [E]xclusive dealing can harm consumers by thwarting entry or inhibiting growth of existing rivals." See United States Department of Justice, *Competition and Monopoly: Single-Firm Conduct Under Section 2 of the Sherman Act*, 2008 (hereafter "DOJ Single-Firm Conduct") at p. 131.

[182] Hovenkamp, The Antitrust Enterprise at p. 206.

[183] DOJ Single-Firm Conduct at pp. 19-20.

[184] DOJ Single-Firm Conduct at p. 21.

[185] Nicholas Economides, "Tying, bundling, and loyalty/requirement rebates," *Research Handbook on the Economics of Antitrust Law*, Einer Elhauge (Ed.), Edward Elgar, 2012 (hereafter "Economides") 121-143 at p. 121.

tying arrangements is that they enable a firm having a monopoly in one market to obtain a monopoly in a second one."[186] This is typically referred to as the "leverage" theory.[187] Tying arrangements can be used by a monopolist in the tying market to foreclose rivals in the tied product market if a "substantial share of the tied product market is foreclosed."[188]

82. It is my opinion, based on evidence I have reviewed, that Intuitive possessed monopoly power in the market for MIST Surgical Robots during the Relevant Period, which provided Intuitive necessary leverage to foreclose competition and maintain its monopoly in the EndoWrist Repair and Replacement Market. I discuss the evidence that forms the bases for this opinion in more detail below.

i. Intuitive Dominated the Market for MIST Surgical Robots in the United States During the Relevant Period

83. According to the DOJ, "courts typically have required a dominant market share before inferring the existence of monopoly power."[189] Evidence I have reviewed demonstrates that Intuitive dominated the market for MIST Surgical Robots during the Relevant Period. For example, a September 2019 Bernstein Research analyst report covering Intuitive and potential competition noted that "Intuitive has held a monopoly position [in the market for surgical robots] for the last two decades."[190] A September

---

[186] Richard A. Posner, *Antitrust Law*. Second Edition, Chicago, IL: The University of Chicago Press, 2001 (hereafter "Posner") at p. 197.
[187] Posner at p. 198.
[188] Economides at p. 130.
[189] DOJ Single-Firm Conduct at p. 21. According to the DOJ: "The Fifth Circuit observed that 'monopolization is rarely found when the defendant's share of the relevant market is below 70%.' Similarly, the Tenth Circuit noted that to establish 'monopoly power, lower courts generally require a minimum market share of between 70% and 80%.' Likewise, the Third Circuit stated that 'a share significantly larger than 55% has been required to establish prima facie market power' and held that a market share between seventy-five percent and eighty percent of sales is 'more than adequate to establish a prima facie case of power.'" See DOJ Single-Firm Conduct at p. 21. The DOJ also noted that the "Eleventh Circuit held that a 'market share at or less than 50% is inadequate as a matter of law to constitute monopoly power.'" See DOJ Single-Firm Conduct at pp. 21-22.
[190] DeSantis Deposition Exhibit 8 at Intuitive-00278221. Similarly, a March 2020 article regarding the robotic surgery market noted: "Intuitive Surgical, manufacturer of the da Vinci Surgical System, has been the uncontested market leader in robotic general surgery for the last two decades. [...] Although Intuitive Surgical has long been the only company with a surgical robot cleared for general surgery, the situation could be about to change." See Dr. Ivan De Backer, "Dissecting the Robotic Surgery Market," IDTechEx, March 30, 2020. Available at: https://www.idtechex.com/en/research-article/dissecting-the-robotic-surgery-market/20232. Also, a September 2018 article published in Annals of the Royal College of Surgeons of England noted that "[f]or 20 years Intuitive Surgical's da Vinci system has held a monopoly in minimally invasive robotic surgery." Andrew Brodie and Nikhil Vasdev, "The future of robotic surgery:

2017 study in the *Journal of Minimal Access Surgery* noted that Intuitive's da Vinci surgical robot was the "the only commercially available robotic equipment" at the time.[191] Similarly, a May 2019 study on the "*Annals of Laparoscopic and Endoscopic Surgery*" noted that Intuitive "[e]ffectively [possessed] a monopoly" in the robotic surgery industry.[192] An April 2018 article regarding robotic surgery published in the *World Journal of Urology* stated: "For the last 20 years, the predominant robot used in laparoscopic surgery has been [d]a Vinci by Intuitive Surgical. This monopoly situation has led to rising costs and relatively slow innovation."[193] Under a section titled "Competition A Modest Threat," an April 2019 Bloomberg Intelligence analyst report covering Intuitive stated:

> Intuitive Surgical is unlikely to face significant competition in robotics until 2020, when Johnson & Johnson and Medtronic are expected to enter the market. Intuitive has a substantial lead being on its fourth-generation platform and having over 5,000 systems installed, and remains specialized while peers will be conglomerates.[194]

A March 2019 article published in Barrons stated that "[Intuitive] is the only major manufacturer of robotic-surgery equipment, with a monopoly on the market for now."[195] An October 2019 Financiële Diensten Amsterdam bv analyst report noted: "Competition for Intuitive Surgical is still insignificant. While large players, among which Johnson & Johnson and Medtronic, are planning competing systems, Intuitive has a strong competitive position, supported by various elements that are both difficult and time-consuming to replicate or substitute, also for large cash-rich players."[196] As of late

---

How robotics could help shape the future of surgical care," Annals of the Royal College of Surgeons of England, September 4, 2018.

[191] Ioannis D. Gkegkes, Ioannis A. Mamais, and Christos Iavazzo, "Robotics in general surgery: A systematic cost assessment." *Journal of Minimal Access Surgery*, Vol. 13, No. 4, 2017, 243-255 at p. 243.

[192] Rafael E. Perez and Steven D. Schwaitzberg, "Robotic surgery: finding a value in 2019 and beyond," *Annals of Laparoscopic and Endoscopic Surgery,* Vol. 4., May 30, 2019 (hereafter "Perez et al.").

[193] Pradeep P. Rao, "Robotic surgery: new robots and finally some real competition!," *World Journal of Urology*, Vol. 36, No. 4, April 2018 (hereafter "Rao") 537-541 at p. 537.

[194] Jason McGorman, "Intuitive Surgical Research," Bloomberg Intelligence, April 2019.

[195] Daren Fonda, "Intuitive Surgical Faces New Competition and FDA Concerns," Barrons, March 18, 2019. Available at: https://www.barrons.com/articles/intuitive-surgical-faces-new-competition-and-fda-concerns-51552903200.

[196] Marcel Oomen, "Record High Growth in Surgical Procedures Triggers Upgrade of Guidance," Financiële Diensten Amsterdam, October 18, 2019, 1-4 at p. 1.

February 2022, Johnson & Johnson and Medtronic had yet to achieve FDA approval to market competing systems in the U.S.[197]

84. In addition, I have reviewed evidence of Intuitive's own acknowledgments of its monopoly in the market for MIST Surgical Robots. For example, Bob DeSantis of Intuitive testified that, between 1999 and 2019, there were not "any viable alternatives to a surgeon that wanted to perform a minimally invasive soft tissue robotic surgery other than the da Vinci surgical robot."[198] In a February 2018 email to colleagues regarding strategies for how to address competition with hospital representatives, Joseph Fridlin of Intuitive stated: "Right now many [hospitals] are very happy to have competition because they hate that we are a monopoly."[199] In a June 2018 email to colleagues, Phil Bradshaw, Intuitive's General Manager in the UK, stated: "What I think we should do behind the scenes is develop a competition talk track around all the areas they mention, and train our people – most of which have not come across any competition in their time at [Intuitive]."[200] In a February 2018 email to colleagues, Ralph Wadensweiler of Intuitive shared a presentation regarding "Robotic Surgical Systems in Urology," and noted the finding that "[s]urgeons don't like the [Intuitive] monopoly."[201]

85. As I previously discussed, at his May 2021 deposition, Glenn Vavoso of Intuitive testified that the only surgical robots that have FDA clearance to perform minimally

---

[197] Elizabeth Cairns, "Intuitive faces down the competition," *Evaluate Vantage*, February 22, 2022 (hereafter "Cairns"). Available at: https://www.evaluate.com/vantage/articles/interviews/intuitive-faces-down-competition. At the time, it was expected that Johnson & Johnson would not achieve FDA approval in the U.S. until 2026, while a competing system from Medtronic was expected to achieve FDA approval in 2022. See Cairns. However, as of October 2022, Medtronic's Hugo surgical robot was still being studied in the U.S. and was not available for sale in the U.S. See Conor Hale, "Medtronic's Hugo surgical robot collects green lights in Europe, Canada, Japan," Fierce Biotech, October 19, 2022. Available at: https://www.fiercebiotech.com/medtech/medtronics-hugo-surgical-robot-collects-green-lights-europe-canada-japan.

[198] DeSantis Deposition at 69:19-24.

[199] Intuitive-00113020. Mr. Fridlin further noted these hospitals "will use this [competition] to beat us up on price. Competition will also come in low balling pricing so they can just get a foothold." See Intuitive-00113020.

[200] Vavoso Deposition Exhibit 13 at Intuitive-00100409.

[201] Intuitive-00029346-47; Riccardo Autorino, MD, PhD, FEBU, "Robotic Surgical Systems in Urology: What's in the Pipeline?," Grand Rounds in Urology, February 7, 2018 (hereafter "GRU Presentation"). Available at: https://grandroundsinurology.com/robotic-surgical-systems-in-urology/. Regarding the "'Monopoly' Issue," Dr. Autorino states: "Certainly, one big issue with robotic surgery is that we have only one company. So, it's a monopoly that is in charge to control the market, and they--the robotic system installed in the world from Intuitive has been exponentially grown over the years." See GRU Presentation.

invasive soft tissue surgeries in the U.S. are TransEnterix, Inc.'s ("TransEnterix")[202] Senhance surgical robot and Medrobotics Corporation's ("Medrobotics") Flex surgical robot.[203] However, evidence demonstrates that these two surgical robots have gained at best a *de minimis* share of the market for MIST Surgical Robots. For example, Glen Vavoso estimated that in 2019 in the U.S., Intuitive's da Vinci surgical robot had an installed base between 3,000 and 3,500; TransEnterix's Senhance had an installed base of 15 or less; and Medrobotics' Flex had an installed base of 10 or less.[204] Mr. Vavoso further testified that in 2020 in the U.S., Intuitive's da Vinci had an installed base between 3,500 and 4,000; TransEnterix's Senhance had an installed base of 15 or less; and Medrobotics' Flex had an installed base between seven and ten.[205] From 2019 to 2020, the da Vinci surgical robot continued to grow and competitors were unable to expand their share of the market, as the installed base of TransEnterix's Senhance and Medrobotics' Flex stayed largely the same, while the Intuitive's da Vinci installed base grew by approximately 500 surgical robots.[206] Consistent with Mr. Vavoso's testimony, U.S. market share in the market for MIST Surgical Robots in 2020 is shown in Table 3 below. As shown, in 2020, Intuitive accounted for over 99 percent of the total installed base of MIST Surgical Robots in the U.S.

---

[202] I understand that in February 2021 TransEnterix, Inc. changed its name to Asensus Surgical, Inc. ("Asensus"). See "TransEnterix Announces Name Change to Asensus Surgical and Introduces a New Category of Surgery, Performance-Guided Surgery," Business Wire, February 23, 2021. Available at: https://www.businesswire.com/news/home/20210223005444/en/TransEnterix-Announces-Name-Change-to-Asensus-Surgical-and-Introduces-a-New-Category-of-Surgery-Performance-Guided-Surgery. Unless otherwise noted, throughout the remainder of this Expert Report I use the names TransEnterix and Asensus interchangeably.

[203] Vavoso Deposition at 85:20-98:6. I have noted that an Intuitive September 2018 "Competitive Landscape" analysis notes that Medrobotics' Flex surgical robot has FDA clearance in the U.S. for "[v]isualization only." See Intuitive-00173706. Similarly, in a 2017 "competitive overview" analysis, Intuitive notes that the Flex surgical robot is for "[r]obotic access, not surgery." See Intuitive-00234762-4838 at 4816.

[204] Vavoso Deposition at 117:14-118:1.

[205] Vavoso Deposition at 118:2-119:2, Exhibit 14.

[206] Vavoso Deposition at 120:3-121:10.

Table 3
2020 U.S. MIST Surgical Robot Market Share

Manufacturer/Robot	Installed Base	Market Share
Intuitive da Vinci	3,720	99.5%
TransEnterix Senhance	7	0.2%
Medrobotics Flex	13	0.3%
Total	**3,740**	**100.0%**

Source: 2020 Intuitive SEC Form 10-K at p. 10; TransEnterix Inc., SEC Form 10-K,filed on March 18, 2018 at p. 31; TransEnterix Inc., SEC Form 10-K, filed on February 27, 2019 at p. 33; Asensus Surgical, Inc., SEC Form 10-K, filed on March 11, 2021 at p. 4; Intuitive-00571075.

86. The evidence discussed above demonstrates that Intuitive dominated the market for MIST Surgical Robots during the Relevant Period. This constitutes one piece of evidence demonstrating that Intuitive possessed monopoly power in the tying market (the market for MIST Surgical Robots) during the Relevant Period.

ii. There Were Significant Barriers to Entry Into the Market for MIST Surgical Robots in the United States During the Relevant Period

87. As I previously discussed, another important requirement in determining whether a firm possessed monopoly power is whether there existed barriers to market entry that would allow the firm to exercise substantial market power for an appreciable period. According to the DOJ, these barriers to entry could include "ones [that were] created by the firm's conduct itself."[207] The DOJ also noted that "circuit courts have found that firms with dominant market shares lacked monopoly power when their market power was insufficiently durable."[208] Evidence I have reviewed demonstrates that there were significant barriers to entry into the market for MIST Surgical Robots during the Relevant Period. I discuss this evidence in more detail below.

88. For example, in a December 2020 Intuitive investment analysis, Enlightened Capital noted "the robotic surgery market is characterized by high customer switching

[207] DOJ Single-Firm Conduct at p. 21.
[208] DOJ Single-Firm Conduct at p. 24.

costs and regulatory barriers. These switching costs are driven by the large capital cost for the robotic systems, and the substantial amount of training surgeons undergo to operate these machines. Furthermore, there are high regulatory barriers to entry, with regulatory approval required for new products to come to market."[209] This investment analysis further noted Intuitive's first-mover advantage in the robotic surgery industry, adding that this "industry is characterized by substantial barriers to entry driven by high customer switching costs, and high regulatory barriers with regulatory approval required for new products to come to market."[210] An April 2020 Informa Pharma Intelligence market research report noted that "barriers to entry are high" in the market for "robotic-assisted [surgical] systems."[211]

89. With respect to MIST Robotic Surgery specifically, a September 2019 Bernstein Research analyst report covering Intuitive and potential competition stated: "We believe that Intuitive has built strong barriers to entry during the 20 years of market leadership in robotic surgery."[212] This September 2019 report continued:

> Whatever happens, we continue to have conviction that it will take multiple years for a legitimate competitive threat to [Intuitive] to materialize. Initiating a limited commercial rollout is just the first step for [Medtronic] and [Johnson & Johnson], and many investors underestimate the time required to build out procedures, gather evidence, gain international approvals, train surgeons, etc. Intuitive has built a formidable competitive moat over the last two decades, and we expect the company to maintain its leadership position in the robotic surgery market for the foreseeable future.[213]

A February 2020 Goldman Sachs Initiation Report noted the following: "What we cannot underscore enough is how significant we view the moat and technological advantage that [Intuitive] has built to date."[214]

---

[209] Enlightened Capital, "Intuitive Surgical (SRG) Investment Analysis," December 10, 2020 (hereafter "Enlightened Capital"). Available at: https://enlightenedcapital.substack.com/p/intuitive-surgical-isrg-investment?utm_source=profile&utm_medium=reader2.
[210] Enlightened Capital.
[211] Marion Webb, "Market Intel: Medtech Giants Read to Battle Frontrunner Intuitive Surgical in 'Soft Surgery Robotics,'" Pharma Intelligence, April 2020 at p. 3.
[212] DeSantis Deposition Exhibit 8 at Intuitive-00278204.
[213] DeSantis Deposition Exhibit 8 at Intuitive-00278204.
[214] DeSantis Deposition Exhibit 9 at Intuitive-00553113.

90. In the market for MIST Surgical Robots, one significant barrier to entry is the high capital costs associated with research and development, as well as the length of time necessary to bring a MIST Surgical Robot to the market and compete effectively. For example, Glenn Vavoso of Intuitive testified that "the entire development process to achieving FDA approval, then being able to market a system -- or a system could be up to, you know, a 10-year journey."[215] He added that bringing a surgical robot to the market "[t]akes a lot of knowhow and time and intellectual horsepower."[216] When asked about barriers to entry in the market for MIST Surgical Robots at deposition, Bob DeSantis of Intuitive testified that it "does take a lot of time and investment to bring a soft tissue robot to market."[217] In a December 2020 Intuitive investment analysis, Enlightened Capital noted that Intuitive "continues to invest heavily in R&D and has seen its R&D budget triple over the past 5 years."[218]

91. Another barrier to entry into the market for MIST Surgical Robots is the extensive portfolio of patents held by Intuitive, which makes it more difficult for potential competitors to design and develop surgical robots of their own and bring them to market. For example, as noted in a December 2020 Intuitive investment analysis from Enlightened Capital:

> From a regulatory standpoint, [Intuitive] has been issued or owns over 2,900 patents and has more than 1,900 active patent applications. Competing products would need to meet the quality standards of [Intuitive's] product offerings to be able to come to market. This represents a substantial hurdle for competitors, as [Intuitive] continually improves its systems.[219]

---

[215] Vavoso Deposition at 132:4-133:4. Mr. Vavoso added: "by the time you complete all of the development work, which might require some research depending on the evolution of the system or the technology that is evolving, it could be clinical trials, which take time. It does entail human factors testing. So how does our system interface with surgeons and staff? And that is usually a requirement of the FDA process that we have to go through. That could be a large chunk of that lengthy process. And you have to submit to the FDA. They evaluate that submission. Uhm, there's back and forth and what the iterations to that and -- you know, over the course of that from concept all the way through design, to -- to marketing could be upwards of 10 years." See Vavoso Deposition at 133:5-24.
[216] Vavoso Deposition at 134:16-22.
[217] DeSantis Deposition at 58:9-17.
[218] Enlightened Capital.
[219] Enlightened Capital.

92. In its 2021 Form 10-K, Intuitive stated: "We place considerable importance on obtaining and maintaining patent, copyright, trademark, and trade secret protection for significant new technologies, products, and processes," adding that as of December 31, 2021, the company "held ownership or exclusive field-of-use licenses for more than 4,200 U.S. and foreign and have filed more than 2,100 U.S. and foreign patent applications."[220] On its website, Intuitive lists 74 and 23 unique patent numbers for various da Vinci surgical robots and EndoWrist surgical instruments, respectively.[221]

93. At deposition, Bob DeSantis of Intuitive testified that the "intellectual property protections that Intuitive has [...] might be a challenge for another company to design around."[222] Similarly, Glenn Vavoso of Intuitive testified that a company seeking to bring a MIST Surgical Robots to the market would "ha[ve] to be mindful of the intellectual property that belongs to another company," such as the patent portfolio Intuitive holds for its da Vinci surgical robots.[223]

94. Another barrier to entry into the market for MIST Surgical Robots is the regulatory requirements and approvals necessary to market MIST Surgical Robots in the U.S. As I discussed above, "[b]efore a medical device can be legally sold in the U.S., the person or company that wants to sell the device must seek approval from the FDA. To gain approval, they must present evidence that the device is reasonably safe and effective for a particular use."[224] At deposition, Glenn Vavoso of Intuitive testified that the FDA approval process "could be a large chunk of th[e] lengthy process" of bringing a MIST Surgical Robot to market.[225] In a December 2020 Intuitive investment analysis, Enlightened Capital noted that "there is an exceptionally high bar to hurdle for competitors to receive FDA approval. Competitor systems would need to be on par if not

---

[220] Intuitive 2021 SEC Form 10-K at p. 14.
[221] See the "Patent Notice" page of the Intuitive website accessed November 28, 2022 (hereafter "Intuitive Patent Notice"), available online at https://www.intuitive.com/en-us/about-us/company/legal/patent-notice. I have noted that, with respect to these patent numbers listed, Intuitive states: "The products and patent numbers shown below may not be all-inclusive. Other patents may protect both the products listed below and other products and services commercialized by Intuitive Surgical, Inc. Additional patents are pending." See Intuitive Patent Notice.
[222] DeSantis Deposition at 60:4-7.
[223] Vavoso Deposition at 150:16-23.
[224] FDA's Role in Regulating Medical Devices.
[225] Vavoso Deposition at 133:5-24.

better than existing [d]a Vinci models. Without the clinical data [Intuitive] has, it will be challenging for [Medtronic]/[Johnson & Johnson] to compete on clinical outcomes."[226] Consistent with this outlook, in a July 2020 email to Intuitive colleagues regarding a planned MIST Surgical Robot from Johnson & Johnson, Ron Bair, Senior Director of Services Innovation and Product Management at Intuitive, stated:

> Team – In case the news hadn't reached you yet, J&J announced a significant delay in their competitive program, and the FDA apparently plans a much more stringent approval process for new entrants into the robotic space.[227]

95. Another significant barrier to entry into the market for MIST Surgical Robots is the large installed base of robots that Intuitive garnered since its da Vinci surgical robots first received FDA approval in 2000. As I discussed above, the number of da Vinci surgical robots installed in hospitals in the U.S. has grown steadily over the last two decades. At deposition, Bob DeSantis of Intuitive testified that Intuitive's large installed base of MIST Surgical Robots in the U.S. posed a challenge to competitors trying to break into the market.[228] In a February 2018 email to Intuitive colleagues regarding his qualitative research into Intuitive's "brand positioning" in the market, Larry Cesnik, Group Manager, Market Research at Intuitive, noted:

> Both [physicians and hospitals] see a multi-pronged **competitive advantage** for Intuitive: pioneer in robotic surgery with a quality/reliable product that has been continually improved over 20 years. (In addition, [Intuitive's] deep penetration into hospitals/medical schools shields it from new competitors in the robotic market.)[229]

96. Intuitive's large installed base has allowed for a large number of surgeons in the U.S. to be trained on the da Vinci surgical platform, which has created a further barrier to entry for new MIST Surgical Robots. For example, in a September 2019 analyst report

---

[226] Enlightened Capital.
[227] Deposition of Ronald Lee Bair, Jr., May 24, 2021 (hereafter "Bair Deposition") Exhibit 4. Mr. Bair added that this development was "[y]et another reminder – what we do isn't easy." See Bair Deposition Exhibit 4.
[228] "Q. There's some challenges that potential competitors face when they're trying to -- to break into that market or providing care to patients; right? A. Yes. Q. One challenge is that there is an already large install[ed] base of da Vinci robots in hospitals around the United States; is that right? A. Yes." See DeSantis Deposition at 59:14-21.
[229] Intuitive-00121229-230 at 229 (emphasis in original).

covering Intuitive, Bernstein Research explained how Intuitive's large installed base creates a barrier to entry in the market for MIST Surgical Robots:

> Surgeons do not like change. If a surgical approach is creating good patient outcomes, it is very difficult to convince a surgeon to consider a new approach. Intuitive has spent 20 years working hard to drive adoption of robotic surgery. Over that time, the company has placed over 5,300 robots and trained over 44,000 surgeons on the da Vinci. And surgeons have invested significant time and energy to learn procedures and build skills on the platform, with over 6 million procedures performed to date and over 14,000 peer-reviewed papers published.[230]

Bernstein Research added:

> As much as surgeons may welcome an alternative to Intuitive, inertia will be an important barrier to switching. Given the time and energy surgeons have invested in building skills on da Vinci, many will resist considering a new, untested platform. And as much as administrators would love to drive costs down, they will struggle to convert [Intuitive] programs to [Medtronic] programs without surgeon support. The new competition will have to be really compelling to make a difference. They will need to earn their right to compete.[231]

In an email to Intuitive executives, Katie Anderson of Anderson Qualitative (a market research firm) discussed her conversation with a Vice President of Purchasing at a medium-sized hospital that was considering purchasing a da Vinci surgical robot, noting: "He said what makes Intuitive unique/competitive advantage vs. other companies is that is has **been around for 20 years & it is in the medical schools where the doctors are being trained.**"[232]

97. Given the large number of surgeons that are trained on the da Vinci surgical platform in the U.S. due to Intuitive's large installed base of MIST Surgical Robots,

---

[230] DeSantis Deposition Exhibit 8 at Intuitive-00278221.
[231] DeSantis Deposition Exhibit 8 at Intuitive-00278221. See, also, DeSantis Deposition Exhibit 8 at Intuitive-00278204. At his May 2021 deposition, Bob DeSantis, Intuitive's Executive Vice President and Chief Product Officer, testified: "Q. Has there been compelling competition such that surgeons have switched away from the da Vinci robot to some other system? A. To date, little." See DeSantis Deposition at 56:19-22.
[232] Intuitive-00011487 (emphasis in original).

evidence demonstrates that hospitals are resistant to switching to alternative MIST Surgical Robots. For example, Edward Harrich of Pullman Hospital testified that surgeons at Pullman have "devoted substantial time and effort learning how to use the da Vinci surgical robot," and further that switching to a competitor surgical robot would entail requiring surgeons to spend valuable time relearning how to use the competitor surgical robot.[233] According to an October 2020 op-ed written by Eve Cunningham, MD, MBA, the Chief Medical Officer of Providence Medical Group:

> Mass exodus of surgeons or recruitment challenges are a risk if robots are restricted or removed from facilities. A 2011 study from the *Journal of Minimally Invasive Gynecology* demonstrated that 58% of ob-gyn residency programs were training their residents in robotics. As a physician leader tasked with hiring a physician workforce, my observation is that new surgeon graduates are making career choices based on their ability to access the tool, a situation also reported in this 2014 article.[234]

Dr. Cunningham added: "Here we are in 2020, and an entire generation of gyn surgeons have adopted and trained on the da Vinci."[235] This is consistent with the evidence discussed earlier in this Expert Report demonstrating that losing a da Vinci surgical robot would have caused hospitals to lose surgeons.[236]

98. The evidence discussed above demonstrates that there are significant barriers to entry into the market for MIST Surgical Robots in the U.S., as hospitals are resistant to

---

[233] Harrich Deposition at 57:4-58:10. Mr. Harrich added that Pullman Hospital had to choose between purchasing the da Vinci robot or a competitor robot, the amount of training the hospital's surgeons have already spent on the Intuitive da Vinci surgical robot and their lack of training on the competitor surgical robot would be a factor in their decision-making. See Harrich Deposition at 57:14-58:23.

[234] Cunningham.

[235] Cunningham.

[236] In the case of Pullman Hospital, back in 2011, the conversation among hospital executives at that time addressed the hospital's potential loss of its entire prostate business if they did not acquire a da Vinci surgical robot. See Harrich Deposition at 124:16-125:9. Further, Pullman's urologist, Dr. John Keizur, informed the hospital that if they were going to keep doing prostate surgeries, they had to get a da Vinci robot. See Harrich Deposition at 124:16-125:9. At deposition, Edward Harrich of Pullman Hospital testified: "Q. Is it fair to say that the prostate surgery was the driver in terms of motivating Pullman to acquire the da Vinci Si in 2011? A. That, and we needed the robot to help land urology-trained surgeons. The ones coming out of school that we talked to, as soon as we said we didn't have a robot, the conversation was over and they moved on." See Harrich Deposition at 125:10-17. Further, Pullman lost a different urologist, Dr. Ullrich, because Pullman did not own a da Vinci surgical robot, and it was only with the later acquisition of a da Vinci robot that they were able to hire his replacement. See Harrich Deposition at 11:21-12:18.

seeking out and purchasing alternatives to the da Vinci surgical robot, even if the switch brings about cost savings to the hospital. As one surgeon explained in an interview for a September 2019 analyst report covering Intuitive:

> We were excited to buy a TransEnterix robot a couple of years ago after suffering under the Intuitive monopoly for many years. We were excited to see a competitor, and the system looked promising. It has some nice features like the eye-catching camera. But it does not stack up to da Vinci – not even close. It's worse than lap, and now it's in storage.[237]

Consistent with this outlook, as Stacey Donovan of Evergreen Health explained, in the current healthcare market, "the Intuitive da Vinci robot is the standard of care in robotic surgery."[238] Similarly, Edward Harrich of Pullman Hospital explained that "in this day and age, [...] to be a top-tier hospital, you should have [...] a da Vinci robot."[239] This constitutes another piece of evidence demonstrating that Intuitive possessed monopoly power in the market for MIST Surgical Robots in the U.S. during the Relevant Period.

iii. Intuitive's Prices for da Vinci Robots Greatly Exceeded Marginal Costs

99. While the control of a large share of sales in the market taken together with the ability to exclude potential competitors means a firm *could* exercise substantial market power, another way of determining whether a firm possesses market power is by looking for the actual *exercise* of market power in the form of higher prices. One measure of market power is the ability of a firm to price in excess of marginal cost. "For the competitive firm, price equals marginal cost; for the firm with monopoly power, price exceeds marginal cost. Therefore, a natural way to measure monopoly power is to examine the extent to which the profit-maximizing price exceeds marginal cost."[240] In 1934, economist Abba Lerner proposed the price-cost margin as "the index of the degree of monopoly power," commonly known as the Lerner Index.[241] Economists often use this

---

[237] DeSantis Deposition Exhibit 8 at Intuitive-00278216.
[238] Donovan Deposition at 44:5-19.
[239] Harrich Deposition at 15:4-11.
[240] Pindyck & Rubinfeld (8th edition) at p. 371
[241] "If P = price and C = marginal cost, then the index of the degree of monopoly power is $(P-C)/P$" see A.P. Lerner, "The Concept of Monopoly and the Measurement of Monopoly Power," *The Review of Economic Studies*, Vol. 1, No.3, 1934, 157-175 at p. 169.

index to measure market power, where the larger the Lerner Index is, the greater is the degree of monopoly power.[242]

100. The market power possessed by a monopolist is defined by one standard economic textbook as follows:

> In contrast to a price-taking competitive firm, a monopoly knows that it can set its own price and that the price chosen affects the quantity it sells. A monopoly can set its price above its marginal cost but does not necessarily make a supracompetitive profit. For example, if a monopoly incurs a fixed cost, its profit may be zero (the competitive level) even if its price exceeds its marginal cost. It is common practice to say that whenever a firm can profitably set its price above its marginal cost without making a loss, it has *monopoly power* or *market power*.[243]

101. Put another way, monopoly power refers to the ability of a firm to persistently price at a level that is significantly higher than the competitive price. I discuss below evidence I have reviewed demonstrating that Intuitive exercised monopoly power in the tying market (the market for MIST Surgical Robots) during the Relevant Period. As I explain, because Intuitive possessed monopoly power in this relevant antitrust market, it was able to price above competitive levels. Thus, this *exercise* of monopoly power constitutes another form of evidence establishing that Intuitive possessed monopoly power in the market for MIST Surgical Robots.

102. For example, as noted above, one indication of Intuitive's exercise of monopoly power in the market for MIST Surgical Robots is the fact that da Vinci robot prices were set well above marginal costs. For example, in one internal analysis covering 2017 through 2020, Intuitive reported that its global Systems business unit earned contribution margins of 65.1 percent and 60.0 percent in 2019 and 2020, respectively.[244] If Intuitive had not dominated the market for MIST Surgical Robots, it would not have been able to raise prices so far above marginal cost to supra-competitive levels and earn the supra-

[242] Pindyck & Rubinfeld (8th edition) at p. 371. By construction, the Lerner Index is always between zero and one; for a perfectly competitive firm, price equals marginal cost; so, the Lerner's index equals zero.
[243] Carlton & Perloff at p. 117.
[244] Intuitive-00595405.

normal profits it earned on its da Vinci surgical robot. Economic theory teaches that in the absence of market power, a firm's prices are driven toward the cost of production.[245] Intuitive's extremely high profit margins on da Vinci surgical robot sales constitutes another piece of evidence indicating that Intuitive possessed market power in the market for MIST Surgical Robots.

103. Additional evidence that prices for da Vinci robots are set well above marginal costs include acknowledgments from Intuitive itself. For example, in a June 2017 summary of an Intuitive meeting that covered brainstorming scenarios for the U.S. MIST Surgical Robot market (particularly with respect to the competitive landscape) that was circulated to Intuitive executives by Catherine Mohr of Intuitive, Intuitive analyzed three market scenarios: a "Best case" scenario, a "Mid level Scenario," and a "Nightmare Scenario."[246] Notably, under these scenarios, as Intuitive loses market power with the advent of new, viable surgical robots, it assumes that it would need to lower its prices in response to that competition.

104. For example, under the "Best case" scenario, Intuitive assumes that it faces "low end competition" from potential new entrants into the market for MIST Surgical Robots, which would result in "[s]ome pricing impact" on Intuitive.[247] Under the "Mid level Scenario," Intuitive assumes that Medtronic and J&J would launch MIST Surgical Robots[248] via existing relationships, which would lead Intuitive to "have to discount to be competitive head to head" with these new surgical robots.[249] Furthermore, under the "Nightmare Scenario," Intuitive assumes that there would be a "[r]elease of multiple robots [that] paralyzes the market," which would cause a "[r]ace to the bottom" in terms

[245] Carlton & Perloff at pp. 666-667.
[246] Vavoso Deposition Exhibit 16, Exhibit 17.
[247] Vavoso Deposition Exhibit 17 at Intuitive-00362753.
[248] Vavoso Deposition Exhibit 17 at Intuitive-00362752. Intuitive assumes under this scenario that the surgical robot launched by J&J is "good not great," and that the surgical robot launched by Medtronic is "'good enough' to make hospitals feel OK about bundling Medtronic's robot." See Vavoso Deposition Exhibit 17 at Intuitive-00362752.
[249] Vavoso Deposition Exhibit 17 at Intuitive-00362752. Under this scenario, Intuitive assumes (among other things) that these "[n]ew robots successfully interfere/delay [Intuitive's] robot sales, but don't stall completely," and that "Anti [Intuitive] pricing sentiment leads to head to head pricing discounting." See Vavoso Deposition Exhibit 17 at Intuitive-00362752.

of robot pricing.[250] I have noted too that, under this scenario in which Intuitive loses most, if not all, of its monopoly power, Intuitive assumes that it "bet wrong on a limited instrument set for the low end and lose it entirely to competitors with full suites of low end instruments."[251] In a set of notes, highlights, and actions following an October 2019 "Quarterly Ops/Strategy Meeting," Intuitive noted that "Intuitive's first phase of business was largely without direct competition," but that the "[n]ext 5-6 years will be bloody. One advantage of competition is that the market will grow faster. Margins will be low until competitors tire of their own low margins."[252] Intuitive later noted that "[i]n a new competitive environment, market share does trump margin."[253]

105. Intuitive's assumptions regarding pricing of its da Vinci robots in response to more and more viable competition is consistent with evidence I have reviewed in the form of acknowledgments from industry observers. For example, a May 2020 study on "Laparoscopic Robotic Surgery" noted: "With competition now in the market for laparoscopic robotic assisted surgery, costs for RAS systems and consumables should start to come down. This in turn should reduce the cost of laparoscopic RAS."[254] An April 2018 article regarding robotic surgery published in the *World Journal of Urology* noted that Intuitive's "monopoly situation has led to rising costs and relatively slow innovation."[255]

106. The evidence discussed above demonstrates that Intuitive exercised monopoly power in the market for MIST Surgical Robots during the Relevant Period in that it was

---

[250] Vavoso Deposition Exhibit 17 at Intuitive-00362752. Under this scenario, Intuitive assumes (among other things) that the "market perceives no differen[ces] in robotic outcomes, negating our technological superiority," "J&J and/or Medtronic manage to leverage their long term relationships to shut us out," and that "[a]nti [Intuitive] pricing sentiment leads to spiteful large buys of competitor products." See Vavoso Deposition Exhibit 17 at Intuitive-00362752.
[251] Vavoso Deposition Exhibit 17 at Intuitive-00362752.
[252] Intuitive-00366044-053 at 045, 050.
[253] Intuitive-00366044-053 at 051.
[254] Longmore et al. at p. 16. This study also noted: "Robotic-assisted surgery has seen a slow uptake due to cost and the holding of patents by Intuitive Surgical limiting the number of RAS systems in the market. With the expiration of the patents, we are now seeing a rise in the number of new RAS systems available or soon to be available. Several systems have achieved CE certification and are now available in the European Union, while only the TransEnterix Senhence [sic] has achieved FDA approval, several others are currently undergoing the process for FDA approval. These new robots will lead to competition and reduce the costs of RAS and will lead to an increase in use. Robotic-assisted surgery will become more common than manual laparoscopic surgery in the near future." See Longmore et al. at p. 17.
[255] Rao at p. 537.

able to price above competitive levels. This exercise of monopoly power constitutes another form of evidence establishing that Intuitive possessed monopoly power in the market for MIST Surgical Robots.

107. The evidence discussed above demonstrates that Intuitive posessed monopoly power in the tying market (the market for MIST Surgical Robots) in the United States during the Relevant Period. In the next section below, I discuss evidence demonstrating that Intuitive used the leverage its monopoly power in the Market for MIST Surgical Robots in the U.S. afforded them to maintain its monopoly in the tied market (the EndoWrist Repair and Replacement Market) in the United States during the Relevant Period.

B. Intuitive Used Its Monopoly Power in the Market for MIST Surgical Robots to Maintain its Monopoly the Market for EndoWrist Surgical Instruments in the United States During the Relevant Period

108. As I previously discussed, I understand from Counsel for the Plaintiff that Plaintiff's allegations in this matter relate to Intuitive's dominance of the market for MIST Surgical Robots with its da Vinci surgical robots, and that, through exclusionary and anticompetitive conduct, Intuitive uses this dominance to maintain its monopoly in a separate market: the EndoWrist Repair and Replacement Market. I also discussed above Plaintiff's allegations that "Intuitive has gone to extraordinary efforts to leverage its monopoly power in robots for use in minimally invasive soft tissue surgery, the repair and support of those robotic systems, and its monopoly power in instruments for use with such robots to foreclose aftermarket repair of those instruments by any competitors," and that an "effect of Intuitive's anticompetitive conduct is to generate and sustain unreasonably high, supra-competitive prices for aftermarket EndoWrist instruments."[256]

109. Having established above that Intuitive possessed market power in the tying market (the market for MIST Surgical Robots), I now demonstrate that Intuitive used that market power to foreclose competition in the tied market (the EndoWrist Repair and

[256] Complaint at ¶87, 110. "Intuitive leverages its market power in the worldwide and domestic markets for the sale of surgical robots used in minimally invasive soft tissue surgery, and the market for repair services for their robots, to pressure customers to use supra-competitively priced replacement EndoWrist parts." See Complaint at ¶65.

Replacement Market). As articulated by Dirk Barten of Intuitive upon learning that the company would not be pursuing Project Dragon (offering refurbished EndoWrist instruments at a lower cost than replacement EndoWrist instruments in response to a competitive threat from third-party repairers): "we use our monopol[y] role to keep competition out."[257] I discuss this evidence in greater detail below.

i. Intuitive's Restrictive Sales, License, and Service Agreement Allowed Intuitive to Maintain Monopoly Power in the EndoWrist Repair and Replacement Market

110. As I previously discussed, I understand Defendant's alleged anticompetitive conduct "to pressure customers to use supra-competitively priced replacement EndoWrist parts"[258] includes Intuitive's standard Sales, License, and Service Agreement (hereafter "Intuitive Service Agreement") for its da Vinci surgical robots, which both expressly "demands that customers further agree to a limited license for the use of EndoWrist instruments," which "expires once an EndoWrist instrument is used up to its maximum number of uses as specified in the documentation accompanying the particular instrument,"[259] and "prohibits customers from engaging any unauthorized third party to repair, refurbish, or recondition EndoWrist instruments, whether before or after the limited use license has expired."[260]

111. Hospitals were required to sign this standard Intuitive Service Agreement in order to purchase a da Vinci surgical robot.[261] One of the terms included in the Intuitive Service Agreement that each hospital was required to sign prohibited hospitals from permitting "any third party to modify, disassemble, reverse engineer, alter, or misuse the

---

[257] Intuitive-00604054-55 at 54.
[258] Complaint at ¶65.
[259] Complaint at ¶4. I understand Plaintiff alleges that "EndoWrists also include an internal memory chip" which "counts the number of times the EndoWrist is attached to a da Vinci robot arm, not an actual measure of usage such as usage time, number of movements, or actuation time." See Complaint at ¶¶30-31. Further, I understand that Plaintiff alleges that the "da Vinci robot system queries the memory chip prior to performing any operations with the particular EndoWrist instrument. After a certain number of uses, usually limited to ten, the EndoWrist instrument is rendered non-operational, based solely on the number of times it is attached to the da Vinci robot arm, without any regard to the actual underlying physical condition of the EndoWrist instrument. Without the services of providers such as SIS, the hospital has no choice but to buy a brand-new replacement EndoWrist instrument from Intuitive at full price." See Complaint at ¶32.
[260] Complaint at ¶4.
[261] Vavoso Deposition at 194:7-10.

system or instruments and accessories."[262] At deposition in a related matter, Glenn Vavoso of Intuitive testified that this term of the Intuitive Service Agreement "prohibits hospitals from using [Rebotix] [R]epair to service EndoWrists for the Intuitive da Vinci surgical robots."[263] Another of the terms included in the Intuitive Service Agreement that each hospital was required to sign stated that the license to use an EndoWrist instrument with the da Vinci surgical robot purchased by the hospital "expires once an Instrument or Accessory is used up to its maximum number of uses as is specified in the Documentation accompanying the Instrument or Accessory."[264] At deposition, Mr. Vavoso testified that he understood this term of the Intuitive Service Agreement to mean that the EndoWrist "instruments have a designated number of lives. And once those lives are used, then the license has expired."[265] And further, to comply with the Intuitive Service Agreement, Mr. Vavoso testified that hospitals must "throw away EndoWrist[s] whose use counters have expired" and "buy new EndoWrists from Intuitive."[266]

112. As I previously discussed, the first step in determining whether exclusionary conduct on the part of a given firm is considered to be anticompetitive is whether that firm maintains significant monopoly power, and that, although the existence of monopoly power is not, by itself, anticompetitive, a firm that engages in exclusionary conduct in an attempt to maintain monopoly power inhibits the competitive process and harms competition.[267] Intuitive's exclusionary conduct in the form of its requirement that all

---

[262] Vavoso Deposition at 194:11-195:11, Exhibit 24 at Intuitive-00067540. Glenn Vavoso of Intuitive testified that this term is included in each of the sales contracts that Intuitive requires hospitals to sign and that he was not "aware of any contract with any hospital that does not include this use of system term." See Vavoso Deposition at 195:4-11.

[263] Vavoso Deposition at 195:12-16. Mr. Vavoso further testified that the Intuitive Service Agreement prohibits hospitals from "repairing, refurbishing, or reconditioning their EndoWrists regardless of how many uses are remaining" on the EndoWrist surgical instrument. See Vavoso Deposition at 197:19-23.

[264] Vavoso Deposition at 195:17-196:14, Exhibit 24 at Intuitive-00067542. At deposition, Glenn Vavoso of Intuitive was unable to "identify any sales contract with the hospital that does not include the language in paragraph 8." See Vavoso Deposition at 198:23-199:2.

[265] Vavoso Deposition at 196:24-197:6.

[266] Vavoso Deposition at 203:5-9. According to Mr. Vavoso, under the terms of the Intuitive Service Agreement, hospitals are "required to dispose of [expired EndoWrists] appropriately" and "certainly not use [expired EndoWrists] again." Vavoso Deposition at 203:20-204:4.

[267] Hovenkamp, The Antitrust Enterprise at p. 206. As I discussed above, according to the DOJ: "Monopoly power is conventionally demonstrated by showing that both (1) the firm has (or in the case of attempted monopolization, has a dangerous probability of attaining) a high share of a relevant market and (2) there are entry barriers – perhaps ones created by the firm's conduct itself – that permit the firm to exercise substantial market power for an appreciable period." See DOJ Single-Firm Conduct at p. 21.

hospitals enter into the Intuitive Service Agreement as a condition of their purchase of a da Vinci surgical robot, as well as Intuitive's continued enforcement of the Intuitive Service Agreement, allowed it to maintain monopoly power in the tied market (the EndoWrist Repair and Replacement Market) during the Relevant Period. I discuss the evidence that forms the bases of this conclusion in greater detail below.

a. Intuitive Dominated the EndoWrist Repair and Replacement Market in the United States During the Relevant Period

113. I discussed above how, according to the DOJ, "courts typically have required a dominant market share before inferring the existence of monopoly power."[268] As I discussed above, Intuitive deliberately designed its da Vinci robots to only work with surgical instruments manufactured by Intuitive (EndoWrists). As a result, "the only entity that sells EndoWrists to hospitals is Intuitive."[269] However, while there were no other entities that competed with Intuitive for the sale of replacement EndoWrist surgical instruments, Intuitive did begin to face a competitive threat recently from third-party repairers of the EndoWrist surgical instruments originally manufactured by Intuitive, as discussed above. However, as a result of Intuitive's Alleged Misconduct, it was able to maintain its dominance of the EndoWrist Repair and Replacement Market during the Relevant Period.

114. For example, in an August 2019 internal analysis of third-party repairs of EndoWrist surgical instruments, Intuitive found that, since 2016, only 18 accounts had been "affected" in that they had EndoWrist surgical instruments repaired by third-party repairers, a fraction of the installed base of 3,531 da Vinci robots Intuitive had in the U.S. in 2019.[270] Intuitive further noted that among the "[a]ccounts affected" worldwide (29 in total), 17 of them were "[n]o longer using reprogrammed instruments" following Intuitive's efforts to enforce the restrictive Intuitive Service Agreement.[271] Similarly, in a February 2020 analyst report in covering the "third party risk" to Intuitive's Instruments & Accessories business segment, Deutsche Bank, having determined that "FDA action to

[268] DOJ Single-Firm Conduct at p. 21.
[269] Vavoso Deposition at 59:4-14, 242:2-23.
[270] Intuitive-00194074-089 at 077; Intuitive Surgical, Inc., SEC Form 10-K, filed February 7, 2020 at p. 10.
[271] Intuitive-00194074-089 at 077, 088.

stymie usage of repaired instruments is highly unlikely," and that "[h]ospitals [are] starting to push[ ]back on legality/enforceability of terms of service," forecasted that a "4-6% penetration of Intuitive's *de novo* instruments on a unit basis in 2021 is reasonable and, based on our additional due diligence, potentially conservative."[272] Based on this forecast, Intuitive would account for the remaining 94 to 96 percent of the EndoWrist Repair and Replacement Market in the U.S.

115. The evidence discussed above demonstrates that Intuitive dominated the EndoWrist Repair and Replacement Market in the U.S. during the Relevant Period. This constitutes another piece of evidence demonstrating Intuitive's possession of monopoly power in the tied market (the EndoWrist Repair and Replacement Market) during the Relevant Period. In the next section, I discuss evidence demonstrating that the restrictive Intuitive Service Agreement that hospitals were required to sign with every purchase of a da Vinci surgical robot created significant barriers to entry in that they limited rivals' (including SIS) ability to compete effectively with Intuitive in the EndoWrist Repair and Replacement Market, allowing Intuitive to maintain its dominance of the EndoWrist Repair and Replacement Market during the Relevant Period.

b. Intuitive's Conduct Prevented Rivals, Including SIS, from Competing Effectively in the EndoWrist Repair and Replacement Market in the United States During the Relevant Period

116. As I previously discussed, one important requirement in determining whether a firm possessed monopoly power is whether barriers to market entry existed that would allow the firm to exercise substantial market power for an appreciable period. Evidence I have reviewed demonstrates that the restrictive Intuitive Service Agreement that hospitals were required to sign with every purchase of a da Vinci surgical robot created significant barriers to entry in that they limited rivals' (include SIS) ability to compete effectively with Intuitive in the tied market (the EndoWrist Repair and Replacement Market).

117. In a February 2020 analyst report in covering the "third party risk" to Intuitive's Instruments & Accessories business segment (which includes the sale of EndoWrist

[272] DeSantis Deposition Exhibit 11 at Intuitive-00566055-057, 067 (emphasis in original). Deutsche Bank made a similar assessment in a January 2020 analyst report. See Intuitive-00552993-53014 at 52994.

instruments), Deutsche Bank noted: "In no uncertain terms, the standard terms of service outlined in customer contracts state that hospitals are precluded from engaging with third parties as well as the potential consequences of violation – nullification of contracts, product warranties, etc."[273] Evidence demonstrates that Intuitive took a number of steps in order to prevent hospitals that had opted to have its EndoWrist surgical instruments repaired by a third-party repair company such as SIS from doing so.

118. In particular, following an initial conversation with the hospital in question, Intuitive would send a form letter to the hospital that detailed Intuitive's concerns with the hospital's use of third-party repair companies and highlighted that Intuitive considered the hospital's use of the repair services a breach of Intuitive's contract with the hospital.[274] Those letters also informed the hospitals that if they continued using repair services, Intuitive would cease servicing their da Vinci robots.[275] Further, if a hospital continued using third-party repair services after receiving Intuitive's letter, Intuitive would in fact stop servicing the hospital's da Vinci robot.[276] Intuitive would also void the warranty on da Vinci robots sold to hospitals and refuse to provide any further service under the terms of that warranty.[277] Evidence I have reviewed establishes that Intuitive's overall process in response to learning of a hospital repairing its EndoWrist surgical instruments through a third-party repairer generally took a short period of time: ten business days for the conversation phase, ten business days for the customer letter, and five business days for account termination.[278] At some point, hospitals would encounter a service message on the da Vinci robot, and without Intuitive providing service, that da Vinci robot would be unusable for surgery.[279]

119. As Ron Bair, Senior Director of Services, Innovation, and Product Management at Intuitive, testified, Intuitive enforces the terms of the Intuitive Service Agreement to stop its customers from using reprogrammed EndoWrist surgical instruments.[280] Mr. Bair

---

[273] DeSantis Deposition Exhibit 11 at Intuitive-00566067.
[274] Vavoso Deposition at 221:3-222:15; DeSantis Deposition at 267:19-269:3.
[275] Vavoso Deposition at 221:3-222:15; DeSantis Deposition at 267:19-269:3.
[276] Vavoso Deposition at 223:14-20; DeSantis Deposition at 262:6-263:3.
[277] Vavoso Deposition at 223:21-224:19.
[278] Deposition of Antonio (AJ) Inacay, June 8, 2021 at 163:1-164:3, Exhibit 7 at Intuitive-00439336.
[279] Vavoso Deposition at 227:13-228:18.
[280] Bair Deposition at 137:11-137:16.

further testified that a hospital's decision to keep using reprogrammed EndoWrist surgical instruments comes with "consequence" imposed by Intuitive: Intuitive will "aggressively pursue the terms" of the Intuitive Service Agreement and, ultimately, will stop servicing hospitals' da Vinci robots if they continue to use third-party repairers such as SIS to repair their EndoWrist surgical instruments.[281] Mr. Bair also testified at deposition that "if Intuitive doesn't service [a da Vinci] robot and the robot fails, it means the hospital can no longer do surgeries with that robot."[282] Edward Harrich of Pullman Hospital agreed, testifying:

> Q. If Intuitive would not perform preventive maintenance on your robot, does your robot have any use at all? [...]
>
> THE WITNESS: It would have no use at all. [...]
>
> Q. If Intuitive refused to provide maintenance on your da Vinci robot, could the da Vinci robot be used for any surgeries?
>
> A. No. If we couldn't have the preventative maintenance, we'd stop using it.[283]

Similarly, in a related matter, Tyler McDonald of Conway Regional Medical Center testified that Intuitive's unwillingness to continue servicing its da Vinci surgical robot was a factor in its decision to no longer have their EndoWrist surgical instruments repaired by third-party repairers, adding that "[w]ithout ongoing service, the robot could potentially become unusable."[284] As I discuss in greater detail below, for hospitals, the threat of having their da Vinci surgical robots that they invested a significant amount of money and other resources (such as surgeon training) into become inoperable was a threat that hospitals took seriously.[285] As a result, after receiving these cease-and-desist letters from Intuitive, many hospitals stopped using third-party services to repair their EndoWrist surgical instruments.[286]

---

[281] Bair Deposition at 134:18-137:10.
[282] Bair Deposition at 136:2-5.
[283] Harrich Deposition at 77:13-24.
[284] Deposition of Tyler McDonald, May 7, 2021 (hereafter "McDonald Deposition") at 19:10-20.
[285] In 2021, a da Vinci surgical robot cost between $0.5 million and $2.5 million. See Intuitive 2021 SEC Form 10-K at p. 58.
[286] Vavoso Deposition at 225:24-226:22.

120. Evidence demonstrates that Intuitive's enforcement of its sales agreement was successful at preventing rival third-party repairers (such as SIS) from competing effectively in the EndoWrist Repair and Replacement Market. For example, at deposition, Greg Posdal, CEO of SIS, testified:

> Q. So what happened with this huge business opportunity for S.I.S.? [...]
>
> THE WITNESS: It started very well, and it was very well received at all the places that we had contacted. Most had actually given us instruments, and we had actually gone through the process and reprogrammed and sent these instruments back to these facilities, a handful, probably 30 or 40. I think there's a form in evidence here that kind of explains who we did that service to. But either it was quickly put down, or before we even got started the customers said they were concerned about moving forward because of what they were told by Intuitive about using third parties for repairing or having any other effect on their instruments. [...]
>
> Q. Do you recall what any of the customers said was specifically a concern coming from Intuitive?
>
> A. Yes. I'll -- their main concerns were that Intuitive had sent letters -- it was a combination, that their representatives were saying to them specifically that they should be not -- should not be using a third party to repair the instruments, that there is specific language in their agreements that prohibit them sending any of these instruments out to third parties for repair, and that there was the threat that they would stop selling them new equipment or servicing the existing robotics for these pieces of equipment.[287]

121. Similarly, at deposition in a related matter, Glenn Papit, one of four founding members of third-party repairer Rebotix, explained that Rebotix "is basically not functional at this moment" because the "customers that we gained received notices from Intuitive that if they used us, they would cancel the service contracts on their robots,

[287] Posdal Deposition at 19:5-20:15.

which frightened the customers to death."[288] Mr. Papit described "two contracts in place that would have led to hundreds of hospitals coming onboard" and getting their EndoWrists repaired by Rebotix, only to lose those contracts as a result of Intuitive's conduct.[289] Mr. Papit further explained: "It was becoming what we would call circular business. As soon as we put an account on and the OEM [Intuitive] discovered it, they would have a management person in there threatening that withdrawal of their service contract, and so soon as you put a customer on, you'd lose them in 60 days."[290] Similarly, Bob Overmars of BPI Medical,[291] estimated that BPI Medical contacted all of its business relationships that owned da Vinci surgical robots (approximately 30 or 40 hospitals) about Rebotix's repair services, but only two decided to use Rebotix's services.[292] When asked why only two opted to use Rebotix's repair services for their EndoWrist surgical instruments, Mr. Overmars testified:

> The Intuitive rep would tell the customer that they would no longer support their robotics program or maintenance of their EndoWrists of the robotic devices if they used a third party for the repair. That scared the customer away and did not give us the opportunity to get those repairs from those other hospitals.[293]

---

[288] 30(b)(6) Deposition of Glenn Papit, June 2, 2021 (hereafter "Papit Deposition") at 33:3-16.

[289] Papit Deposition at 238:2-25. Mr. Papit testified: "Q. What contracts are those? A. Premier GPO and BayCare Health System. Q. What is it that Intuitive did with respect to the Premier GPO contract? A. They tied the purchase of EndoWrists to the service contract for the robot, two separate products, and threatened to remove the service contract if they used our service to repair the EndoWrists. Q. And they did that with Premier? A. They did that with any hospital that was using us. Q. Well, but Premier isn't a hospital, right? A. Correct. Q. So what is it that Intuitive did with respect to the Premier agreement that Rebotix had? [...] THE WITNESS: The Premier agreement gave us access to the hospitals, and they went to the hospitals that we accessed and did what we have discussed at length to stop them from using us. [...] Q. Okay. And what is it that you claim Intuitive did with respect to Rebotix's contract with BayCare Health System? A. The same thing. They did primarily the same thing at all of the hospitals. They threatened the service contracts, and they said that we required a 510(k) because we were reprocessing." See Papit Deposition at 238:17-239:20.

[290] Papit Deposition at 240:11-21.

[291] BPI Medical is a "full service medical equipment company." See BPI Medical, "About Us." Available at: https://www.bpimedical.com/about-us/. Around mid-2018, BPI Medical had a business relationship with Rebotix in which BPI Medical would send EndoWrist surgical instruments to Rebotix for repair, as BPI Medical itself did not repair EndoWrist surgical instruments. See Overmars Deposition at 11:18-13:9.

[292] Overmars Deposition at 116:21-117:5.

[293] Overmars Deposition at 116:21-117:16. Mr. Overmars further testified: "Q. At some point your relationship with Rebotix Repair came to an end; is that right? A. Correct. Q. And why is that? A. No hospitals would give us an EndoWrist for repair anymore. Q. Did they tell you why that was? A. Yes. Because the Intuitive rep threatened to remove the services." See Overmars Deposition at 117:18-118:1. See, also, Overmars Deposition at 120:2-123:12.

122. Similarly, evidence in the form of hospitals' acknowledgments that they stopped having their EndoWrist surgical instruments repaired by third parties following communications from Intuitive provides additional evidence demonstrating that the restrictive Intuitive Service Agreement that hospitals were required to sign with every purchase of a da Vinci surgical robot created significant barriers to entry in that they limited rivals' (including SIS) ability to compete effectively with Intuitive in the EndoWrist Repair and Replacement Market. For example, in a related matter regarding third-party repairer similar to SIS (Rebotix), Stacey Donovan of Evergreen Hospital testified:

> Q. Why did Evergreen decide to stop using Rebotix Repair's Services?
>
> A. We made the decision to stop using the repair services based on communication from Intuitive -- based on the communication from Intuitive. [...]
>
> Q. Did Evergreen stop using Rebotix's services because it could not afford to have its da Vinci robots no longer serviced by Intuitive? [...]
>
> THE WITNESS: Yes, that's the reason the decision was made to stop.[294]

Similarly, Edward Harrich, Director of Surgical Services at Pullman Regional Hospital, testified:

> Q. [...] Upon receiving the letter from Intuitive about the violation of your contract and the statement that it would no longer provide maintenance services, did your hospital immediately decide to terminate its relationship with Rebotix Repair?
>
> A. Yes.[295]

---

[294] Donovan Deposition at 54:5-10, 58:7-13. Ms. Donavan also testified: "Q. Do the maximum use restrictions that Evergreen imposes on EndoWrists and your inability to use repair services to extend the lives of your EndoWrists force Evergreen to purchase more EndoWrists than it would otherwise purchase from Intuitive? [...] THE WITNESS: I would say yes." See Donavan Deposition at 26:11-19.

[295] Harrich Deposition at 82:2-8. Mr. Harrich also testified: "Q. If it weren't for Intuitive's contractual limitations, would your hospital use Rebotix's services to the full extent that Rebotix was willing to provide them? A. Yes." See Harrich Deposition at 62:6-10. Mr. Harrich further testified: "Q. "Why did your hospital stop using Rebotix Repair services? A. Well, we were informed that our preventative maintenance contract, that we were in violation of it. And so we read through the contract, saw that it did say that if we used an outside vendor for instrumentation, that the preventative maintenance contract could and, after talking with Intuitive, would be potentially canceled, so we quit using them." See Harrich Deposition at 69:8-16. Regarding the loss of Intuitive's maintenance services, Mr. Harrich testified: "Q. When you said you did not want to get in the bad graces of Intuitive, why not? A. Because the Intuitive robot, if they stop

Also, in a related matter, Tyler McDonald of Conway Regional Medical Center testified that it is no longer repairing its EndoWrist surgical instruments through third parties because it was informed that continuing to do so would mean it could no longer make purchases of replacement EndoWrist surgical instruments from Intuitive when needed, adding that Conway Regional Medical Center "understood that failure to acquire new instruments and accessories would negatively impact [its] ability to continue operating [its] robot."[296]

123. Further evidence the restrictive Intuitive Service Agreement (and Intuitive's enforcement of said agreement) successfully created significant barriers to entry that prevented EndoWrist surgical instrument repair companies such as SIS from entering and/or competing effectively in the EndoWrist Repair and Replacement Market includes acknowledgments from Intuitive itself. For example, regarding the cease-and-desist letters Intuitive sent to hospitals upon learning that the hospital had been using third-party repairer Rebotix to repair EndoWrist surgical instruments rather than having them replaced by Intuitive, Glenn Vavoso of Intuitive testified:

> Q. Is there any instance that you can identify, as Intuitive's 30(b)(6) witness, where a hospital continued using Rebotix's services after receiving these letters from Intuitive?
>
> A. Not -- not at this time.[297]

In response to a June 2019 email alerting Intuitive executives that Evergreen Hospital in Seattle, WA, had a "3rd party company 're-chipping' the arms and resetting I&A lives to save cost," Patrick Swindon of Intuitive noted that Intuitive had "an updated process for handling these sorts of situations that was developed in agreement with regulatory, post market and legal which we've been using for a few months now to great success."[298]

124. The evidence discussed above demonstrates that the restrictive Intuitive Service Agreement that hospitals were required to sign with every purchase of a da Vinci surgical

---

maintaining it, I would have no one to go to that could come in and maintain our robot. If my robot is down, I've got seven unhappy surgeons. I put the hospital in a bad situation." See Harrich Deposition at 76:22-77:3.

[296] McDonald Deposition at 18:1-25, 34:25-35:9.

[297] Vavoso Deposition at 225:24-226:22.

[298] Intuitive-00106127-28 at 27.

robot created significant barriers to entry in that they limited rivals' (including SIS) ability to compete effectively with Intuitive in the EndoWrist Repair and Replacement Market. This constitutes one piece of evidence demonstrating how Intuitive used the leverage its monopoly in the tying market (the market for MIST Surgical Robots) afforded to maintain its monopoly power in the tied market (the EndoWrist Repair and Replacement Market) during the Relevant Period.

c. Intuitive's Exercise of Monopoly Power in the EndoWrist Repair and Replacement Market During the Relevant Period

125. As I noted above, one piece of evidence that a firm possesses market power in a relevant antitrust market is the *exercise* of that power, especially in setting prices. One indication of Intuitive's exercise of monopoly power in the tied market (the EndoWrist Repair and Replacement Market) is the fact that prices for EndoWrist surgical instruments which Intuitive supplied (exclusively during the Relevant Period) were set well above marginal costs. Because Intuitive possessed monopoly power in the EndoWrist, it was able to price above competitive levels. For example, Bob DeSantis of Intuitive testified that the contribution margin[299] earned by Intuitive on sales of new replacement EndoWrist surgical instruments was approximately 89 percent.[300] This is consistent with a financial analysis performed in connection to a pilot program concerning refurbished EndoWrist surgical instruments, which found that the contribution margin for refurbished EndoWrist surgical instruments was 84 percent, a "5 point decrease [(89 percent)] compared to new builds."[301] If Intuitive had not dominated the EndoWrist Repair and Replacement Market, it would not have been able to raise prices so far above marginal cost to supra-competitive levels, and earn the supra-normal profits it earned on EndoWrist surgical instruments. Economic theory teaches that in the absence of market power, a firm's prices are driven toward the cost of production.[302]

---

[299] A firm's contribution margin reflects the amount of revenue earned by a firm above its variable costs. Contribution margins are often used by managers to analyze the profitability of different products manufactured and sold by a given firm. See, for example, Jonathan E. Duchac, James M. Reeve, and Carl S. Warren, *Financial and Managerial Accounting*, Twelfth Edition, Mason, OH: South-Western Cengage Learning, 2014 at pp. 890-892.
[300] DeSantis Deposition at 249:18-22.
[301] Bair Deposition at 52:19-53:11, Exhibit 5 at Intuitive-00042956. See, also, Intuitive-00686068.
[302] Carlton & Perloff at pp. 666-667.

Intuitive's extremely high profit margins on EndoWrist surgical instrument sales constitutes another piece of evidence indicating that Intuitive possessed market power in the EndoWrist Repair and Replacement Market.

126. The evidence discussed above demonstrates that Intuitive used its monopoly power in the tying market (the market for MIST Surgical Robots) to maintain its monopoly in the tied market (the EndoWrist Repair and Replacement Market) in order to charge supra-competitive prices on the EndoWrist surgical instruments it sold to hospitals. As I discuss in the section below, evidence demonstrates Intuitive's alleged misconduct in this regard caused harm to competition in the EndoWrist Repair and Replacement Market.

C. Evidence Demonstrates that Intuitive's Alleged Misconduct Caused Harm to Competition in the EndoWrist Repair and Replacement Market

127. Earlier in this Expert Report I discussed evidence demonstrating that, during the Relevant Period, (i) Intuitive maintained significant monopoly power in the EndoWrist Repair and Replacement Market; and (ii) Intuitive's exclusionary conduct prevented rivals, including SIS, from competing effectively in the EndoWrist Repair and Replacement Market. As I previously discussed, the third factor in determining whether exclusionary conduct on the part of a firm is considered anticompetitive in that it caused harm to competition is whether the exclusionary conduct results in lower market output to customers, or higher prices paid by customers. Evidence I have reviewed demonstrates that, as a result of Intuitive's Alleged Misconduct, hospitals had little choice but to pay higher prices for replacement EndoWrist instruments from Intuitive in order to use their da Vinci surgical robots than they otherwise would have had they been able to repair their EndoWrist surgical instruments through third-party repair companies such as SIS. I discuss the evidence that forms the basis of this conclusion in greater detail below.

i. Intuitive's Patient Safety Claims

128. As I previously discussed, the restrictive Intuitive Service Agreement that hospitals were required to sign prohibited hospitals from permitting "any third party to modify, disassemble, reverse engineer, alter, or misuse the System or Instruments and

Accessories."[303] The Intuitive Service Agreement also stated that the license to use an EndoWrist instrument with the da Vinci surgical robot purchased by the hospital "expires once an Instrument or Accessory is used up to its maximum number of uses, as is specified in the Documentation accompanying the Instrument or Accessory."[304] At deposition, Mr. Vavoso testified that he understood this term of the Intuitive Service Agreement to mean that the EndoWrist "instruments have a designated number of lives. And once those lives are used, then the license has expired."[305] I understand that Intuitive claims that this requirement was necessary due to patient safety concerns associated with allowing third parties to repair its EndoWrist surgical instruments.[306]

129. I understand that, in his expert report in this matter, Plaintiff's regulatory expert, Mr. Philip J. Phillips, addresses a recent action taken by the FDA with respect to 510(k) clearance for the marketing of reprocessed Intuitive Surgical da Vinci model S/Si EndoWrist instruments by a company called Iconocare Health ("Iconocare").[307] In its September 2022 letter to Iconocare, the FDA concluded:

> The design, materials, and intended use of the 8mm Monopolar Curved Scissor Instruments, after an additional ten (10) reuse cycles are equivalent to the predicate device. The mechanism of action of the subject device is identical to the predicate device in that the same standard mechanical design, materials, and sizes are utilized. There are no changes to the claims, intended use, clinical applications, patient population, or method of operation. The change in device specifications is to extend the useful life of the 8mm Monopolar Curved Scissor Instruments.[308]

---

[303] Vavoso Deposition at 194:11-195:11, Exhibit 24 at Intuitive-00067540. Glenn Vavoso of Intuitive testified that he was not "aware of any contract with any hospital that does not include this use of system term." See Vavoso Deposition at 195:4-11.
[304] Vavoso Deposition at 195:17-196:14, Exhibit 24 at Intuitive-00067542. At deposition, Glenn Vavoso of Intuitive was unable to "identify any sales contract with the hospital that does not include the language in paragraph 8." See Vavoso Deposition at 198:24-199:2.
[305] Vavoso Deposition at 196:15-197:6.
[306] See, for example, Deposition of Myriam Curet MD, May 7, 2021 (hereafter "Curet Deposition") at 107:7-25.
[307] Telephone conversation with Mr. Philip J. Phillips, dated December 1, 2022.
[308] FDA, Letter to Iconocore Health, "RE: K210478," dated November 15, 2022. Available at https://www.accessdata.fda.gov/cdrh_docs/pdf21/K210478.pdf.

I understand that Mr. Phillips opines that Iconocare demonstrated to FDA's satisfaction that modifying and relabeling each presumably-used Intuitive device to create a reprocessed device, with an additional 10 uses, is substantially equivalent to the predicate devices.[309] I understand that, in Mr. Phillip's opinion, this establishes that the "intended use" of Intuitive's marketed EndoWrist device is the same as the intended use of Iconocare Health's newly-cleared device.[310]

130. I understand Mr. Phillips concludes that Iconocare provided performance data to the FDA that demonstrated that the reprocessed devices are as safe and effective as the predicate devices and operate as originally intended.[311] I also understand that Mr. Phillips further asserts that it is not surprising that FDA determined the Iconocare EndoWrist device to be substantially equivalent, as it is virtually identical to the predicate devices in all respects and one would anticipate that they are as safe and effective.[312] Based on Mr. Phillip's analysis of the FDA's recent clearance of reprocessed EndoWrist instruments, I understand Mr. Phillips has concluded that Intuitive's claims that it is unsafe to use EndoWrist surgical instruments more than the maximum number of times imposed by Intuitive appears to be inconsistent with the determination made recently by the FDA.

131. For the purposes of my analysis contained in this Expert Report, I rely on the opinions of Mr. Philip Phillips regarding the FDA's assessment of the safety of reprocessed EndoWrist surgical instruments as compared to Intuitive's newly manufactured replacement EndoWrist surgical instruments. Additional evidence I have reviewed is consistent with Mr. Phillips' conclusions regarding the FDA's assessment of the safety of reprocessed EndoWrist instruments. For example, at deposition, Nicky Goodson, Senior Director for Service Operations at Intuitive, testified that Intuitive has not done testing of any kind to determine whether refurbished or repaired EndoWrists

[309] Telephone conversation with Mr. Philip J. Phillips, dated December 1, 2022.
[310] Telephone conversation with Mr. Philip J. Phillips, dated December 1, 2022.
[311] Telephone conversation with Mr. Philip J. Phillips, dated December 1, 2022.
[312] Telephone conversation with Mr. Philip J. Phillips, dated December 1, 2022.

performed by third-party repairers similar to SIS would be unsafe to use with the da Vinci surgical robot in MIST surgery.[313] Ms. Goodson further testified:

> Q. Aside from your personal opinion, do you have any evidence that EndoWrists repaired or refurbished by Restore or Rebotix have put patients at risk?
>
> A. No.[314]

Grant Duque, Director of Core Instruments Design Engineering at Intuitive, similarly testified that he was not aware of any testing that had been done on refurbished EndoWrist instruments performed by third-party repairers similar to SIS.[315] Furthermore, at deposition, Dan Jones, Intuitive's Director of External Affairs, testified that when sending letters outlining patient safety claims to hospitals that were using third party repairers to refurbish EndoWrist instruments, he was unaware of the types of tests those third-party repairers were performing to ensure the safety of the EndoWrist instruments they refurbished.[316]

132. The evidence discussed above is consistent with the opinions contained in Mr. Phillips' expert report that, despite Intuitive's claims to the contrary, EndoWrist instruments repaired or reprocessed by third parties such as SIS were equally as safe as the newly manufactured replacement EndoWrist instruments hospitals were required to purchase directly from Intuitive.

ii. Intuitive Used its Alleged Misconduct in the EndoWrist Repair and Replacement Market to Continue to Charge Supra-Competitive Prices for the Replacement of EndoWrist Instruments, Causing Harm to Competition

133. When a firm possesses monopoly (or market) power[317] in a well-defined antitrust market, it is able to raise the price of that good above the marginal cost of production and earn excess (that is, supra-competitive) profits on the sales of that good. The exercise of

---

[313] Goodson Deposition at 243:2-244:6. See, also, DeSantis Deposition at 213:16-216:21, 244:15-245:11.
[314] Goodson Deposition at 257:7-10.
[315] Deposition of Grant Duque, November 8, 2022 at 149:9-151:8.
[316] Deposition of Dan Jones, November 10, 2022 at 73:4-74:7.
[317] The term "monopoly power" is often used interchangeably with "market power" by economists. I view monopoly power as the most extreme version of market power. That is, a firm with a high share of the market may have *market power* even when there are two or more firms in a well-defined antitrust market.

monopoly power results in harm to competition, which reduces consumer welfare and creates inefficiency in the economy. This exercise of monopoly power forms a central focus of antitrust economics. Evidence I have reviewed demonstrates that Intuitive abused its monopoly power in the EndoWrist Repair and Replacement Market (monopoly power it maintained through its allegedly unlawful tying of the purchase of EndoWrist surgical instruments from Intuitive to the purchase of da Vinci surgical robots, as discussed above). Intuitive's abuse of its monopoly power resulted in harm to competition as hospitals had little choice but to pay higher prices for replacement EndoWrist instruments from Intuitive in order to use their da Vinci surgical robots than they otherwise would have had they been able to repair their EndoWrist surgical instruments through third-party repair companies such as SIS. As Edward Harrich of Pullman Regional Hospital testified at deposition in a related matter involving third-party repairer Rebotix, "reducing the costs of EndoWrists by using the Rebotix Repair service improve[s] the hospital's profitability associated with procedures that used the da Vinci system."[318]

134. As I discussed above, Intuitive earned a contribution margin of approximately 89 percent on sales of new replacement EndoWrist surgical instruments.[319] If Intuitive's allegedly unlawful conduct had not conferred substantial market power in the EndoWrist Repair and Replacement Market, it would not have been able to charge prices so far above marginal cost and earn the supra-normal profits it earned on EndoWrist surgical instruments. As I noted elsewhere, as a matter of economics, in the absence of market power, a firm's prices are driven toward the cost of production.[320] Evidence I have reviewed demonstrates that, had Intuitive not engaged in its Alleged Misconduct and hospitals been able to repair their EndoWrist surgical instruments through third-party repair companies such as SIS, at least some hospitals would have paid lower prices for EndoWrist surgical instruments than they did in the actual world. I discuss this evidence in greater detail below.

[318] Harrich Deposition at 63:15-19.
[319] DeSantis Deposition at 249:18-22.
[320] Carlton & Perloff at pp. 666-667.

135. Evidence I have reviewed indicates that the EndoWrist surgical instruments repaired by third parties such as SIS were viewed as functionally equivalent to the replacement EndoWrist surgical instruments sold by Intuitive. For example, in a January 2020 analyst report covering Intuitive, Deutsche Bank noted:

> Repaired da Vinci instruments were all manufactured by Intuitive and designed to become disabled for use beyond 10x, but third parties like Restore Robotics have developed technologies to repair these used devices, confirm that functionality and condition have been restored to *de novo* specifications, and then ship them back to the hospitals for additional use.[321]

Consistent with this finding, Deutsche Bank also noted that there was "**[n]o evidence that repaired da Vinci instruments specifically pose a risk to patient safety – in fact, au contraire.**"[322] Deutsche Bank added: "**Bottom line regarding safety is that, despite Intuitive's view on this point, any material threat to patient safety would surely have prompted immediate FDA field action to stop their usage, which has not been the case.**"[323]

136. Also consistent with these findings, in a related matter involving another third-party repairer similar to SIS (Rebotix), Edward Harrich, Director of Surgical Services at Pullman Regional Hospital, testified that the surgeons, first assists, and scrub assists that Pullman Hospital that used "Rebotix-repaired EndoWrists" were not able to "discern any differences between the Rebotix-repaired EndoWrists and the EndoWrists that had not been repaired or serviced by Rebotix."[324] Mr. Harrich further testified that Pullman

---

[321] Intuitive-00552993-53014 at 52993 (emphasis in original). Deutsche Bank added: "Notably, these devices are typically reparable up to four times. Third party servicing of medical devices has been ongoing for decades, and FDA's comfort around this practice regarding patient safety is quite clear." See Intuitive-00552993-53014 at 52993.

[322] Intuitive-00552993-53014 at 52998 (emphasis in original).

[323] Intuitive-00552993-53014 at 52998 (emphasis in original). In this report, Deutsche Bank included due diligence "feedback from da Vinci surgeons" regarding the use of EndoWrist surgical instruments that had been repaired by third-party repairers. See Intuitive-00552993-53014 at 53000-53002. One such surgeon noted that the that the "[c]linical experience to date has been positive, with no reports of device malfunction or adverse events." See Intuitive-00552993-53014 at 53000. Another surgeon noted that the "[c]linical experience has been satisfactory, with no reports of device malfunction or adverse events." See Intuitive-00552993-53014 at 53001. Another "Surgeon noted that the hospital has had no cases of device malfunction or adverse events, and based on this favorable trial phase experience usage is likely to expand over the next year or two." See Intuitive-00552993-53014 at 53002.

[324] Harrich Deposition at 38:8-39:3.

Hospital never "reject[ed] a Rebotix-repaired EndoWrist for any reason."[325] Similarly, in another related matter, Tyler McDonald of Conway Regional Medical Center testified that a group of surgeons at his hospital conducted a trial of EndoWrist surgical instruments repaired by Restore Robotics,[326] and that, upon completing that trial, those surgeons "couldn't tell any difference between [the repaired EndoWrist surgical instruments] and the other instruments that came directly from Intuitive."[327]

137. Economic theory demonstrates that in a market for an interchangeable product, competition between two firms would result in lower prices than under a pure monopoly (like the one Intuitive was able to maintain during the Relevant Period as a result of its Alleged Misconduct), as suppliers would have competed with each other to raise their own sales at their competitor's expense. Indeed, evidence indicates that Intuitive understood that price erosion would have occurred in the EndoWrist Repair and Replacement Market if third-party repair companies such as SIS were able to enter the market and compete effectively. As I discussed above, evidence I have reviewed demonstrates that Intuitive investigated responding to the growing competitive threat from lower-priced third-party repairers of EndoWrist surgical instruments (such as SIS) by selling refurbished EndoWrist surgical instruments at a discount off of the cost of the replacement EndoWrists it sells to hospitals (often referred to as Project Dragon).[328] For instance, in July 2017, Intuitive created an internal presentation regarding an update on Project Dragon from earlier in the year "[g]iven the sensitivity to the price and margins of such a large revenue stream."[329] Regarding the benefits to hospitals of refurbished EndoWrist instruments, Intuitive stated: "A 20% discount is proposed. This discount

[325] Harrich Deposition at 42:18-43:19.
[326] I understand Restore Robotics pays "a sizable license fee" to use Rebotix's patented Interceptor "technology to reset the usage counter on EndoWrist instruments for the da Vinci Si robot systems." See United States District Court for the Northern District of Florida, *Restore Robotics LLC and Restore Robotics Repair LLC v. Intuitive Surgical, Inc.*, No, 5:19-cv-00055-MCR-MJF, First Amended Complaint, May 13, 2019 at ¶75; Papit Deposition at 71:21-72:14, 83:1-6; Deposition of David Mixner, June 10, 2021 at 13:23-14:6, 120:17-121:6.
[327] McDonald Deposition at 13:20-17:25, 67:22-68:15.
[328] Intuitive-00103456-478 at 459. Intuitive noted that these refurbished EndoWrist surgical instruments "will be equally capable to new." See Intuitive-00103456-478 at 459.
[329] Intuitive-00103456-478 at 457.

balances: RF instrument cost, requested I&A costs in various regions, and our DESIRED LEADERSHIP POSITION in robotics."[330] Intuitive added:

> As a part of that leadership position, it seems important that Dragon be a tool to demonstrate our commitment to our customers. We have listened to their needs and could provide a solution for reduced pricing. However, the discount of 20% (versus a deeper 30% discount) maintains our position as an equal business partner and does not force us into a commodity position.[331]

Intuitive also noted that the "[d]iscount applies whether they are shipped new or remanufactured instrument."[332] With regards to how this program would help Intuitive maintain its "leadership position" in the face of the competitive threat from third-party repair companies, Intuitive stated:

> Reprocessing SUD [single-use device] companies are commoditized and centralized with broad offerings. Currently, the closest parallel to our refurbished instrument is the reprocessed SUD market. This market is highly commoditized and centralized. The large players have very wide portfolios spanning EP, cardiac, lap products, etc. Given their broad offering and deep discounts of around 50% we would be challenged to compete should they enter with cleared, refurbished, robotic instruments. Even should they not enter we will be having sales discussions with purchasers who expect a deep discount on refurb or reprocessed devices.... unless we can position it otherwise.[333]

Also, regarding its "leadership position," Intuitive stated that "if someone is going to pursue refurbishing of dV instruments it should be us as the OEM for the patients [sic] sake and for ours. For revenue reasons and for maintaining our leadership position," adding:

> If a large player were to enter with reprogramming or refurbishing we have lost our leadership position in this segment of robotics. Our users could vilify us for

---

[330] Intuitive-00103456-478 at 458. Intuitive also noted: "First and foremost, Dragon is an opportunity for our customers to have improved running costs associated with da Vinci procedures." See Intuitive-00103456-478 at 458.
[331] Intuitive-00103456-478 at 458. Intuitive added: "we are already seeing 3rd party companies enter with reprogrammed dV instruments. By offering Dragon we can increase customer confidence in refurb, lower cost instruments as part of our mission to put Patients First." See Intuitive-00103456-478 at 458.
[332] Intuitive-00103456-478 at 459.
[333] Intuitive-00103456-478 at 459.

> not extending lives or refurbishing sooner. And the good will/partnership equity that we could get for refurbishing is completely diminished. Additionally we lose the position to set what the discount should be for refurbished robotic instruments.[334]

138. Regarding Project Dragon, evidence I have reviewed indicates that, despite the benefits of the program to hospitals in the form of lower operational costs and to Intuitive itself in the form of allowing it to protect its "leadership position" from third-party repairers, Intuitive initially decided in August 2017 not to pursue this plan and offer refurbished EndoWrist surgical instruments to hospitals at a lower cost than replacement EndoWrist surgical instruments. Upon hearing of this decision, Mike Prindiville of Intuitive remarked that he believed the project was still "a wise strategic investment," but that the "question is more timing (i.e. when do we really need a lower cost/revenue product for I&A) rather than any technical concerns."[335] In response to a September 2017 email from Katie Scoville regarding the decision not to pursue Project Dragon at the time, Dirk Barton of Intuitive stated:

> I want to remark the following. In case we need to drop I+A pricing in some regions – to add the message in volume contracts that those sites would accept also partial deliveries based on refurbished material would avoid potential push back from competition – telling that we use our monopol[y] role to keep competition out.[336]

Mr. Barton added that "[p]otential usage of refurb material allows us to lower pricing."[337] I understand that, while Intuitive revisited the idea of offering refurbished EndoWrist surgical instruments at a discount off of replacement EndoWrist surgical instruments, the project was ultimately "never sellable" in the U.S., and Intuitive ended its refurbished EndoWrist surgical instrument efforts in the second quarter of 2020.[338] In May 2021,

---

[334] Intuitive-00103456-478 at 464.
[335] Intuitive-00602576-78 at 76.
[336] Intuitive-00604054-55 at 54.
[337] Intuitive-00604054-55 at 54.
[338] Scoville Deposition at 12:11-13:15, 91:24-92:21. Following its August 2017 decision not to pursue Project Dragon, Intuitive briefly revived a version of the project in April 2018 that was "not purely collections," rather Intuitive was "investigating a partnership with a supplier (medline) who does kitting for products and can also do collections." See Intuitive-00604127; Intuitive-00604123. However, the Project Dragon phase of Intuitive's proposed refurbishment program ended in 2018. See Intuitive-00594883-4902

Katie Scoville of Intuitive testified that the company was not actively "exploring the possibility of refurbishing EndoWrists."[339]

139. Consistent with Intuitive's own expectations, evidence I have reviewed indicates that the cost to hospitals associated with repairing their EndoWrist surgical instruments through a third-party repairer such as SIS was significantly lower than the cost to purchase replacement EndoWrist surgical instruments from Intuitive.[340] For example, upon learning in November 2019 that Marin General Hospital had been using SIS to repair its EndoWrist instruments, Intuitive assessed the competitive threat from SIS and learned that SIS was offering its repair services at a "40-50% discount" off of Intuitive's replacement EndoWrists.[341] Intuitive further noted that Marin General Hospital was "very proud of this and celebrated the cost savings."[342] Similarly, in September 2019, Intuitive executives discussed how to deal with an inquiry from UF Shands regarding the use of SIS's services to save money by repairing its EndoWrist instruments, during which time Intuitive learned that UF Shands had been alerted to the cost savings by its Group Purchasing Organization, which noted:

> Two of [its] members, Kaiser Permanente and Legacy Health System are capturing savings by using Intuitive Surgical Endowrist refurbishment products. Surgical Instrument Service Company (SIS) is now the only supplier providing refurbishment to Intuitive Surgical's da Vinci EndoWrist. SIS offers a refurbished da Vinci EndoWrist at approximately 40% savings.[343]

---

at 4884. Further, around June 2019, began a pilot program that, like Project Dragon, "still concern[ed] the potential refurbishment of EndoWrists." See Scoville Deposition at 116:4-118:5. This pilot program involved the collection of used EndoWrist surgical instruments to test the refurbishment process on a small scale and to help develop potential business models. See Intuitive-00594883-4902 at 4884; Scoville Deposition Exhibit 10. However, this refurbishment pilot program ended in 2020. See Intuitive-00594883-4902 at 4884. When asked why the program ended in 2020, Ms. Scoville testified: "We had piloted a sufficient amount -- we had gathered, I should say a sufficient amount of data to do the assessment and technical feasibility. And based on what we learned, we didn't think that further assessment was a high enough priority project for the company." See Scoville Deposition at 12:14-13:5. See, also, Goodson Deposition at 72:5-74:3.

[339] Scoville Deposition at 13:10-15. See, also, Goodson Deposition at 72:5-74:3.

[340] 30(b)(6) Posdal Deposition at 58:4-22.

[341] Intuitive-00110451-55 at 51.

[342] Intuitive-00110451-55 at 55.

[343] Intuitive-00110252-54 at 54.

140. Similarly, at deposition in a related matter, Edward Harrich of Pullman Hospital testified that the average cost of an EndoWrist surgical instrument purchased from Intuitive was approximately $2,000, whereas the average cost to have an EndoWrist surgical instrument serviced by Rebotix was approximately $1,332, which amounted to annual savings to Pullman Hospital of $62,400.[344] Mr. Harrich further testified that Rebotix offered Pullman Hospital repaired EndoWrist surgical instruments at a 40 percent discount off of the cost of replacement EndoWrist instruments from Intuitive.[345] In another related matter, Tyler McDonald of Conway Regional Medical Center testified that his hospital observed cost savings from using EndoWrist surgical instruments repaired by third parties, and that "Conway [would] still be refurbishing the instruments today if it could do so."[346] In a January 2020 analyst report covering Intuitive, Deutsche Bank noted that "[m]eaningful operating cost savings opportunity is the key driver compelling hospitals to consider using these repaired da Vinci instruments."[347] Relatedly, a letter sent by third-party repairer Rebotix to hospitals around August 2019 noted that using Rebotix to repair EndoWrist surgical instruments would provide "45% [a]verage saving per instrument," which would amount to "[a]verage [s]avings of over $200,000 per year, per S or Si robot."[348]

141. Further, evidence I have reviewed demonstrates that the prices Intuitive charged for its EndoWrist surgical instruments were significantly higher than the prices charged by TransEnterix for the surgical instruments used in conjunction with its Senhance surgical robot. For example, in a 2017 internal Instruments & Accessories analysis, Intuitive noted that the "[c]ompetitive [p]osition" of TransEnterix's Senhance core surgical instruments were that they offered "'[u]nlimited' lives, lower per procedure cost" as compared to EndoWrist core surgical instruments.[349] Steven D. Schwaitzberg of

---

[344] Harrich Deposition at 68:8-69:4.
[345] Harrich Deposition at 88:16-89:14.
[346] McDonald Deposition at 17:20-25.
[347] Intuitive-00552993-53014 at 52993. As part of this analyst report, Deutsche Bank sought feedback from two hospital supply chain managers (one that oversees purchasing for nine hospitals in the Northeast and the other that is the "SVP of purchasing for a major hospital network comprising 28 hospitals across several states"), who both noted that their "team's financial analysis points to 'fairly substantial' operating cost savings opportunity with usage of repaired instruments." See Intuitive-00552993-53014 at 53003-53004.
[348] Intuitive-00372699-2703 at 2702-2703.
[349] Intuitive-00292544-2628 at 2556.

University of Buffalo's Department of Surgery noted in a 2019 interview that a "recent internal review [performed by Kaleida Health in Buffalo, NY] revealed an average instrument cost of $3,400 per *da Vinci* procedure, which is significantly higher than the projected $800–1,600 instrument costs for *Senhance*."[350] A February 2018 Piper Jaffrey analyst report covering Intuitive found that, despite the surgical robots themselves being priced similarly, "[o]f particular interest to hospitals is the lower per procedure cost of Senhance (roughly one-half of what [Intuitive] charges)," adding that one of the pros of TransEnterix's Senhance as compared to Intuitive's da Vinci is that "[c]laims per-procedure pricing similar to current laparoscopic procedures (~$700), mainly driven by reusable instruments with minimal disposables per case (for example, each instrument can be used, according to the company, 150-200 times compared to da Vinci at ~10-20)."[351]

142. Evidence I have reviewed demonstrates that, had Intuitive not engaged in its Alleged Misconduct and hospitals been able to repair their EndoWrist surgical instruments through third-party repair companies such as SIS, at least some hospitals would have paid lower prices for EndoWrist surgical instruments than they did in the actual world. Evidence I have reviewed also demonstrates that Intuitive's Alleged Misconduct caused harm to competition in the tied market (the EndoWrist Repair and Replacement Market) in that hospitals had little choice but to pay higher prices for replacement EndoWrist instruments from Intuitive in order to use their da Vinci surgical robots than they otherwise would have had they been able to repair their EndoWrist surgical instruments through third-party repair companies such as SIS.

143. For example, in a February 2020 analyst report in covering the "third party risk" to Intuitive's Instruments & Accessories business segment (which includes the sale of EndoWrist instruments), Deutsche Bank included Intuitive's "[l]everaging its dominant market position" as a "[m]itigant[] to [t]hird-[p]arty [e]ncroachment," adding:

> While some hospitals are now starting to question the legality/enforceability of contract terms of service, there are also those whose surgeons are simply

[350] Perez et al. at p. 6.
[351] Intuitive-00364420-444 at 423.

> unwilling to risk losing access to Intuitive's technologies. We spoke with a supply chain executive of a major academic center that recently began using repaired da Vinci instruments, but upon receipt of an ensuing cease-and-desist notice from the company's lawyers, stopped.[352]

This assessment of the effect of Intuitive "[l]everaging its dominant market position" is consistent with the evidence discussed earlier in this Expert Report regarding Intuitive's successful efforts to leverage its restrictive Intuitive Service Agreement that hospitals were required to sign with every purchase of a da Vinci surgical robot to prevent hospitals from repairing their EndoWrist surgical instruments through third parties such as SIS, thus leaving hospitals with little choice but to pay higher prices for replacement EndoWrist instruments from Intuitive in order to use their da Vinci surgical robots than they otherwise would have had they been able to repair their EndoWrist surgical instruments through third-party repair companies such as SIS.

144. Further, an October 2018 "Qualitative IDI Research Report" prepared by Advantis for Intuitive found:

> **Cost** is still a concern for users of [robotic assisted surgeries], and this can impact the choice of surgical technique (e.g., not using the robot for simple cases), but is more often expressed as a frustration felt due to the monopoly position that da Vinci has, which requires hospitals to buy equipment and maintenance for their da Vinci system directly, with no competition that might improve pricing or generate innovation.[353]

A 2013 article titled "The robotic surgery monopoly is a poor deal" noted that "Intuitive Surgical can command high premiums seemingly because of its monopoly position as the sole supplier of soft tissue robotic surgical equipment."[354] Also, in November 2016, Dr. William Mayfield, Chief of Surgery at Wellstar Health System in Georgia, stated the following regarding Intuitive:

---

[352] DeSantis Deposition Exhibit 11 at Intuitive-00566074.
[353] Intuitive 00246469-491 at 489 (emphasis in original).
[354] Abhishek Trehan and Tristan J. Dunn, "The robotic surgery monopoly is a poor deal," *The BMJ*, Vol. 347, December 19, 2013, 1-2 at p. 1.

> As a final note, the capital and carrying costs are still extremely high for Intuitive Surgical products. This has been tolerated (and I do not use the term lightly) in a monopoly marketplace. Demonstration of value at the hospital level under our current circumstances is challenging. Although the business principles of margins and return to investors is 'standard in the industry', as I described to you, the current business model of medical technology companies is unsustainable on a global scale. Our rising surgical supply costs are incompatible with the value delivered or return obtained. Competition in your space will have some effect on your business, and I urge you to stay ahead of the curve. There may be some pent up emotional backlash reflected in future sales when competition appears.[355]

145. In response to a November 2019 request for quotes from customers from a recent Intuitive study regarding the cost associated with Intuitive's products, Kelvin Tsai of Intuitive provided a summary of quotes from surgeons, hospital administrators/executives, OR staff, and robotic coordinators.[356] One surgeon in Mr. Tsai's summary stated the following regarding Intuitive: "**Market monopoly,** expensive equipment."[357] One hospital administrator/executive stated: "Their robot products are of great quality, but **they know they don't have any competition** for their disposables. As a result, their prices are expensive."[358] Similarly, one OR staff member in Mr. Tsai's summary stated that the "**price** of [Intuitive's] instruments and disposables are an **extremely high amount,**" with another OR staff member stating that Intuitive is "[e]xpensive & **had the market cornered for a long time resulting in overpricing**."[359]

---

[355] Intuitive-00141567-68 at 67.
[356] Intuitive-00133628-630.
[357] Intuitive-00133628-630 at 628 (emphasis in original). Another surgeon in Mr. Tsai's summary said Intuitive "[p]ush[es] their product and **do[es] not allow for other modes such as laparoscopy** and it's not ok as their product is not proven. Despite high usage, **I can't wait for competitors.**" See Intuitive-00133628-630 at 628 (emphasis in original).
[358] Intuitive-00133628-630 at 628 (emphasis in original). Another hospital administrator/executive in Mr. Tsai's summary described Intuitive in the following way: "Poor partner, lack transparency, **no negotiation on pricing,** poor explanations of defective devices, sales team too forceful, borderline deceptive information." See Intuitive-00133628-630 at 628 (emphasis in original). Similarly, another hospital administrator/executive in Mr. Tsai's summary was quoted stating that Intuitive is "not easy to work with. **They have a monopoly,** just wait for a competitor to move the business." See Intuitive-00133628-630 at 628 (emphasis in original).
[359] Intuitive-00133628-630 at 628 (emphasis in original).

Also, a robotic coordinator in Mr. Tsai's summary said Intuitive made "[e]xcellent products, but **expensive and have a monopoly** on most robotic supplies."[360]

146. Further, following the expiration of their EndoWrist surgical instruments,[361] hospitals are required to dispose of expired EndoWrist surgical instruments and, in order to continue using their da Vinci surgical robots, must purchase replacement EndoWrist surgical instruments directly from Intuitive.[362] However, as noted above, EndoWrist surgical instruments are typically reparable multiple times.[363]

147. Thus, absent the Alleged Misconduct, each new EndoWrist instrument purchased by a hospital could typically be repaired multiple times by a third-party repairer such as SIS at a lower cost, as opposed to having little choice but to pay a higher price for a new replacement EndoWrist surgical instrument every time a given EndoWrist surgical instrument reached the maximum use limit imposed by Intuitive, as was the case in the actual world.[364] Therefore, had hospitals been able to extend the useful life of their EndoWrist surgical instruments by having them repaired multiple times through third-party repairers such as SIS, they could have reaped the cost savings of repairing their EndoWrist surgical instruments rather than replacing them several times over before it was necessary to purchase a new replacement EndoWrist surgical instrument from

---

[360] Intuitive-00133628-630 at 628 (emphasis in original). Another robotic coordinator in Mr. Tsai's summary said Intuitive is "the only company with robotic surgical stuff, but that doesn't mean it's great. It's **super overpriced and hyped up**." See Intuitive-00133628-630 at 628 (emphasis in original).

[361] Evidence I have reviewed indicates that Intuitive typically set the maximum number of uses for EndoWrist surgical instrument at ten. See, for example, DeSantis Deposition at 137:20-138:6; Intuitive 2021 SEC Form 10-K at pp. 8, 58. I understand that in October 2020, Intuitive introduced its Extended Use Program that allowed select da Vinci Xi and da Vinci X EndoWrist surgical instruments to be used twelve to 18 times, as compared to the typical ten uses. See Intuitive 2021 SEC Form 10-K at pp. 8, 58.

[362] Intuitive-00091257-1351 at 1272, 1274, 1289, 1291; McDonald Deposition at 13:13-19.

[363] See, for example, Intuitive-00552993-53014 at 52993.

[364] At deposition, Edward Harrich of Pullman Regional Hospital testified that Intuitive's maximum use restriction on EndoWrist surgical instruments and an inability to have their EndoWrist surgical instruments repaired by a third-party repair company forced Pullman to "buy additional EndoWrists that [it] otherwise wouldn't purchase," adding: "Well, soon as -- as soon as we hit our ten lives or whatever the limit number is on that instrument, we will have to purchase new ones and we can't use them any further." See Harrich Deposition at 30:4-18. Similarly, Stacey Donovan of Evergreen hospital testified: "Q. Do the maximum use restrictions that Intuitive imposes on EndoWrists force Evergreen to purchase more EndoWrists than it otherwise would purchase? [...] THE WITNESS: I don't -- I don't know how to answer that because we don't have the option to not -- to continue to use those instruments without purchasing new ones when they reach end of life." See Donovan Deposition at 24:6-14. In a related matter, Tyler McDonald of Conway Regional Medical Center testified: "Q. (By Mr. Berhold) When an instrument reaches the usage limit, does Conway have to purchase a new one? A. Yes. Q. And why is that? A. The instrument no longer works with the robot." See McDonald Deposition at 13:13-19.

Intuitive. As Deutsche Bank noted in a February 2020 analyst report in covering the "third party risk" to Intuitive's Instruments & Accessories business segment (which includes the sale of EndoWrist instruments), asserted:

> And even with this modest [4-6 percent] unit share capture, the resultant impact to Intuitive's top-line would be amplified given that each instrument can be repaired multiple times. In our base case scenario of 5% *de novo* unit share capture in 2021 and the assumption that each instrument is repaired 3x on average, our analysis indicates a top-line hit on the order of $193 million or 3.4% of total company sales in 2021.[365]

148. The evidence discussed above demonstrates that Intuitive's Alleged Misconduct caused harm to competition in that, as a result, hospitals had little choice but to pay higher prices for replacement EndoWrist instruments from Intuitive in order to use their da Vinci surgical robots than they otherwise would have had they been able to repair their EndoWrist surgical instruments through third-party repair companies such as SIS. This evidence is consistent with the evidence I discussed earlier in this Expert Report demonstrating that more hospitals would have had their EndoWrist surgical instruments repaired more often than they otherwise did had it not been for Intuitive's exclusionary conduct in the form of its requirement that all hospitals enter into the Intuitive Service Agreement as a condition of their purchase of a da Vinci surgical robot, as well as Intuitive's continued enforcement of the Intuitive Service Agreement.

[365] DeSantis Deposition Exhibit 11 at Intuitive-00566056 (emphasis in original). See, also, Intuitive-00552993-53014 at 53007.

VI. Conclusions

149. Based on my analyses and research into the U.S. market for MIST Surgical Robots and EndoWrist Repair and Replacement Market, as well as my training and experience in economics, I have concluded that the market for MIST Surgical Robots in the United States constitutes a relevant antitrust market with respect to the tying market for evaluating the Alleged Misconduct. I have also concluded that the market for EndoWrist Repair and Replacement Market in the United States constitutes a separate relevant antitrust market with respect to the tied market for evaluating the Alleged Misconduct. I have also concluded that Intuitive possessed monopoly power in the U.S. market for MIST Surgical Robots during the Relevant Period. Based on my training and experience in economics as well as my research and analysis into the relevant antitrust markets at issue here, I have also concluded that Intuitive used its monopoly power in the market for MIST Surgical Robots to maintain its monopoly in the EndoWrist Repair and Replacement Market in the U.S. during the Relevant Period. I have also concluded as a matter of economics that Intuitive's Alleged Misconduct was anticompetitive and resulted in harm to competition in that hospitals had little choice but to pay higher prices for replacement EndoWrist surgical instruments from Intuitive in order to use their da Vinci surgical robots than they otherwise would have paid had they been able to repair their EndoWrist surgical instruments through third-party repair companies such as SIS.

Russell L. Lamb, Ph.D.

December 2, 2022

Appendix A

MEG | MONUMENT ECONOMICS GROUP

Russell Lamb, Ph.D.
President
Monument Economics Group
Phone: (703) 615-3474
Email: rlamb@megconsulting.com

Professional Summary

Russell Lamb is an expert in antitrust economics and has testified concerning antitrust liability, impact, and damages. He has an extensive background in applied econometrics and has developed econometric models to measure damages in a number of matters involving allegations of horizontal price fixing. He has provided expert testimony in State and Federal Courts in the United States and in Canada on a range of issues including class-certification and economic damages in antitrust, RICO and consumer fraud matters. In addition, he has provided expert advice to client attorneys at all levels of the litigation. Dr. Lamb has an extensive background in the analysis of domestic and international agricultural markets and has authored more than 50 articles in peer-reviewed economics journals, trade press, and major newspapers.

Dr. Lamb's work has been cited by courts in certifying classes in the United States and Canada. For example, in In re Aftermarket Automotive Lighting Products Antitrust Litigation, the court held that his analysis provided "a sufficient basis from which to conclude that Plaintiffs would adduce common proof concerning the effect of Defendants' alleged price-fixing conspiracy on prices class members paid." In certifying the Class in In re: Titanium Dioxide Antitrust Litigation, the Court said, "This Court finds that Dr. Lamb's regression analysis accurately reflects the characteristics of the titanium dioxide industry, and the facts in this case." In In Re: Domestic Drywall Antitrust Litigation, the Court cited extensively to Dr. Lamb's analysis in its decision to certify the Class: "Dr. Lamb's expert opinion fits the facts of the case, is relevant, and is therefore admissible to show classwide injury and measurable damages in support of Plaintiffs' Motion for Class Certification. [...]

The Court [...] has thoroughly considered Dr. Lamb's opinion in its decision on the DPPs' Class Certification Motion." In the Canadian LCD Competition Act Class Action, the Court held that Dr. Lamb's analysis provided "evidence of a viable methodology for the determination of loss on a class-wide basis." In In re: Puerto Rican Cabotage Litigation, the Court held that "Dr. Lamb [had] set forth a reputable and workable model for determining damages as to individual class members." In certifying the class in Clarke and Rebecca Wixon, et al. v. Wyndham Resort Development Corp., et al., the Court held that "Dr. Lamb [had] presented a plausible class-wide method of proof." In certifying the class in Eugene Allan, et al., v. Realcomp II, Ltd., et al., the Court held that "the Plaintiffs have produced sufficient evidence that common proofs will yield a finding of class-wide damages that predominates over any specific individualized damages. The Lamb Report and Lamb Reply are sufficient to establish this fact." Furthermore, Dr. Lamb was the Indirect Purchaser Plaintiffs' expert in the In re: Polyurethane Foam Antitrust Litigation matter, which was certified by the Court in April 2014.

With regard to agricultural economics, Dr. Lamb has a particular expertise in agricultural markets and has undertaken extensive original research and econometric analysis on markets for agricultural commodities. His articles on agricultural economics have been published in peer-reviewed journals, trade press, and major newspapers. Dr. Lamb regularly presents at conferences on topics including the state of the U.S. Economy and farm policy.

Prior to co-founding Monument Economics Group, Dr. Lamb was a Senior Vice President at Nathan Associates Inc., where he directed the firm's litigation consulting practice nationally. Dr. Lamb previously served as a Principal at AACG in Arlington, VA, and as Managing Director and DC Office Head at Econ One Research. He earlier served as an Assistant Professor of Agricultural Economics and faculty member of the Graduate Group in Economics at North Carolina State University and as an Economist and Senior Economist in the Federal Reserve System of the United States, at the Federal Reserve Board and the Federal Reserve Bank of Kansas City.

Education

- Ph.D., Economics, University of Pennsylvania, 1994
- M.A., Economics, The University of Maryland, 1989
- B.A., Economics, The University of Tennessee, 1987

Expert Testimony Offered

2022 *Anthony Oliver, et al. v. American Express Company, et al.*

- United States District Court Eastern District of New York
- Case No. 1:19-cv-00566
- Expert Report, September 30, 2022
- Supplemental Expert Report, October 19, 2022
- Opinion concerning class certification and damages issues
- Retained by Berman Tabacco

Las Vegas Sun, Inc. v. Sheldon Adelson, et al.

- United States District Court District of Nevada
- Case No. 2:19-cv-01667
- Expert Report, September 19, 2022
- Opinion concerning damages issues
- Retained by Lewis Roca Rothgerber Christie LLP

Value Drug Company v. Takeda Pharmaceuticals U.S.A., Inc., et al.

- United States District Court Eastern District of Pennsylvania
- Case No. 21-CV-3500
- Expert Report, July 25, 2022
- Amended Expert Report, July 28, 2022
- Testified at deposition, August 17, 2022
- Testified at deposition, September 15, 2022
- Testified at class certification hearing, November 1, 2022
- Expert Report, November 17, 2022
- Opinion concerning class certification and damages issues
- Retained by Berger & Montague, P.C.

Serge Asselin v. Ainsi Canada, Inc. et al.

- Cour Supérieure District de Québec
- Case No. 200-06-000203-169
- Expert Report, May 31, 2022
- Opinion concerning market factors
- Retained by Siskinds LLP, Sotos LLP

In Re Caustic Soda Antitrust Litigation

- United States District Court Western District of New York
- Case No. 1:19-cv-00385-EAW-MJR
- Expert Report, April 25, 2022
- Testified at deposition, June 6, 2022
- Expert Reply Report, August 25, 2022
- Testified at deposition, September 23, 2022
- Opinion concerning class certification and damages issues

- Retained by CERA LLP

Boothe Farms, Inc., et al. v. The Dow Chemical Co., et al.

- United States District Court Eastern District of Arkansas Northern Division
- Case No. 3:19-cv-00264-DPM
- Expert Report, April 15, 2022
- Supplemental Expert Report, April 20, 2022
- Testified at deposition, May 4, 2022
- Declaration, May 19, 2022
- Opinion concerning damages issues
- Retained by Lieff Cabraser Heimann & Bernstein, LLP

2021 *In Re: Takata Airbag Product Liability Litigation*

- United States District Court Southern District of Florida Miami Division
- MDL No. 2599
- Expert Report, December 23, 2021
- Testified at deposition, January 25, 2022
- Opinion concerning class certification and damages issues
- Retained by Podhurst Orseck

In Re: Broiler Chicken Antitrust Litigation

- United States District Court Northern District of Illinois Eastern Division
- Case No. 1:16-cv-08637
- Expert Report, December 20, 2021
- Testified at deposition, February 8, 2022
- Expert Rebuttal Report, July 29, 2022
- Testified at deposition, September 1, 2022
- Opinion concerning damages issues
- Retained by Polsinelli

KPH Healthcare Services, Inc. a/k/a Kinney Drugs, Inc. v Gilead Sciences, Inc., et al.

- United States District Court Northern District of California San Francisco Division
- Case No. 3:20-cv-06961-EMC
- Expert Report, October 19, 2021
- Declaration, February 25, 2022
- Declaration, April 13, 2022
- Declaration, April 26, 2022
- Testified at deposition, May 18, 2022
- Expert Merits Report, June 28, 2022
- Expert Rebuttal Report, June 30, 2022
- Testified at deposition, July 19, 2022
- Testified at deposition, July 25, 2022
- Expert Rebuttal Report, August 12, 2022

- Expert Rebuttal Damages Report, August 16, 2022
- Testified at deposition, August 31, 2022
- Opinion concerning class certification and damages issues
- Retained by Roberts Law Firm, P.A.

In Re: Mallinckrodt plc, et al.

- United States Bankruptcy Court District of Delaware
- Case No. 20-12522 (JTD)
- Expert Report, August 13, 2021
- Expert Reply Report, August 26, 2021
- Testified at deposition, September 8, 2021
- Supplemental Expert Report, October 29, 2021
- Testified at trial, November 12 and 15, 2021
- Expert Reply Report, December 1, 2021
- Testified at trial, December 16, 2021
- Opinion concerning damages
- Retained by Eimer Stahl LLP and Willkie Farr & Gallagher LLP

Rebotix Repair LLC v. Intuitive Surgical, Inc.

- United States District Court Middle District of Florida Tampa Division
- Case No. 8:20-cv-02274-VMC-TGW
- Expert Report, July 26, 2021
- Testified at deposition, October 19, 2021
- Opinion concerning monopolization issues
- Retained by Dovel & Luner

Irene Breckon and Gregory Sills v. Alsaker AS, et al.

- Federal Court of Canada
- Court File No. T-1664-19
- Expert Report, July 1, 2021
- Expert Reply Report, July 5, 2022
- Opinion concerning class certification issues
- Retained by Siskinds LLP, Sotos LLP, and Koskie Minsky LLP

Gazarek Realty Holdings Ltd., et al. v. Corning Incorporated, et al.

- Ontario Superior Court of Justice
- Court File No. CV-16-549735-00CP
- Expert Report, April 15, 2021
- Opinion concerning class certification issues
- Retained by Camp Fiorante Matthews Mogerman LLP, Sotos LLP, Siskinds LLP

Kate O'Leary Swinkels v. ZF Friedrichshafen Ag, et al.

- Ontario Superior Court of Justice
- Court File No. CV-18-00604648-00CP
- Expert Report, April 15, 2021

- Expert Reply Report, January 19, 2022
- Opinion concerning class certification issues
- Retained by Camp Fiorante Matthews Mogerman LLP, Sotos LLP, Siskinds LLP

David Regan v. Masonite International Corporation, et al.

- Federal Court of Canada
- Court File No. T-1049-20
- Expert Report, March 31, 2021
- Opinion concerning class certification issues
- Retained by Siskinds LLP

In Re: JELD-WEN Holding, Inc. Securities Litigation

- United States District Court for the Eastern District of Virginia Richmond Division
- Case No. 3:20-CV-00112-JAG
- Expert Declaration, January 4, 2021
- Expert Reply Declaration, February 15, 2021
- Testified at deposition, February 26, 2021
- Opinion concerning anticompetitive conduct issues
- Retained by Labaton Sucharow LLP and Robbins Gellar Rudman & Dowd LLP

2020 *In Re Namenda Indirect Purchaser Antitrust Litigation*

- United States District Court Southern District of New York
- Case No. 1:15-CV-06549
- Expert Report, July 6, 2020
- Testified at deposition, July 23, 2020
- Expert Reply Report, September 21, 2020
- Opinion concerning class certification and damages issues regarding indirect purchasers
- Retained by Miller Law LLC and Safirstein Metcalf LLP

In Re: Interior Molded Doors Antitrust Litigation

- United States District Court for the Eastern District of Virginia Richmond Division
- Case No. 3:18-CV-00718-JAG
- Class Certification and Trial Expert Report, January 31, 2020
- Testified at deposition, March 4, 2020
- Class Certification and Trial Expert Reply Report, June 9, 2020
- Testified at deposition, July 16, 2020
- Opinion concerning class certification and damages issues
- Retained by Spector Roseman Kodroff & Willis, P.C., and Berger & Montague, P.C.

2019 *In Re Zetia (Ezetimibe) Antitrust Litigation*

- United States District Court for the Eastern District of Virginia Norfolk Division
- Case No. 2:18-MD-02836-RBS-DEM
- Expert Declaration, November 18, 2019
- Testified at deposition, December 20, 2019
- Expert Trial Declaration, January 13, 2020
- Expert Reply Declaration, February 20, 2020
- Testified at class certification hearing, May 1, 2020
- Expert Trial Reply Declaration, May 8, 2020
- Expert Supplemental Declaration, May 15, 2020
- Testified at deposition, June 9, 2020
- Opinion concerning class certification and damages issues
- Retained by Miller Law LLC and Motley Rice LLC

GAËTAN ROY c. JTEKT Corporation & al. (Bearings/Roulements)

- Cour Supérieure District de Québec
- Case No. 200-06-000159-130
- Expert Report, November 12, 2019
- Opinion concerning class certification issues
- Retained by Siskinds LLP, Sotos LLP

First Impressions Salon, Inc., et al., v. National Milk Producers Federation, et al.

- United States District Court for the Southern District of Illinois
- Case No. 3:13-cv-00454-NJR-SCW
- Expert Report, January 4, 2019
- Testified at deposition, February 13, 2019
- Expert Reply Report, May 3, 2019
- Testified at deposition, May 17, 2019
- Opinion concerning class certification and damages issues
- Retained by Barrett Law Group, NastLaw LLC, and Roberts Law Firm

Sheridan Chevrolet Cadillac Ltd., et al., v. JTEKT Corporation, et al.

- Ontario Superior Court of Justice
- Court File No. CV-13-478644-00CP
- Expert Report, January 2, 2019
- Opinion concerning class certification issues
- Retained by Sotos LLP

2018 *Sheridan Chevrolet Cadillac Ltd., et al., v. Hitachi Ltd., et al.*

- Ontario Superior Court of Justice
- Court File No. CV-14-506683-00CP
- Expert Report, October 4, 2018
- Opinion concerning class certification issues
- Retained by Sotos LLP

In Re Suboxone Direct Purchaser Antitrust Litigation

- United States District Court for the Eastern District of Pennsylvania
- Case No. 2:13-MD-02445-MSG
- Expert Report, September 18, 2018
- Testified at deposition, October 30, 2018
- Merits Expert Report, November 30, 2018
- Expert Rebuttal Report, January 11, 2019
- Testified at deposition, January 17, 2019
- Expert Merits Rebuttal Report, April 26, 2019
- Testified at deposition, June 12, 2019
- Opinion concerning class certification, merits, and damages issues
- Retained by Berger & Montague, P.C.; Garwin Gerstein & Fisher LLP; and Faruqi & Faruqi LLP

William Rushing, et al. v. Williams-Sonoma, Inc., et al.

- United States District Court Northern District of California, San Francisco Division
- Case No. 3:16-cv-01421-WHO
- Expert Report, July 25, 2018
- Opinion concerning class certification issues
- Retained by Rose Law Group, PC

The Hospital Authority of Metropolitan Government of Nashville and Davidson County, Tennessee, et al. v. Momenta Pharmaceuticals, Inc., et al.

- United States District Court Middle District of Tennessee Nashville Division
- Civil Action No. 15-cv-1100
- Testified at deposition, October 10, 2018
- Expert Report, June 22, 2018
- Expert Reply Report, September 21, 2018
- Testified at class certification hearing, May 13, 2019
- Declaration, May 21, 2019
- Expert Merits Report, May 24, 2019
- Declaration, June 18, 2019
- Expert Report, July 5, 2019
- Expert Supplemental Reply Report, July 5, 2019
- Testified at hearing, July 12, 2019
- Expert Merits Reply Report, July 29, 2019
- Testified at deposition, August 13, 2019
- Opinion concerning class certification and damages issues regarding indirect purchasers
- Retained by Lieff Cabraser Heimann & Bernstein, LLP

2017 *Fady Samaha and Urlin Rent a Car Ltd. v. Yamashita Rubber Co., Ltd., et al.*

- Ontario Superior Court of Justice

- Court File No. CV-13-472262-00CP
- Expert Report, December 4, 2017
- Supplemental Report, July 13, 2018
- Expert Reply Report, January 23, 2020
- Testified at deposition, April 20, 2020
- Supplemental Report, September 30, 2020
- Opinion concerning class certification issues
- Retained by Siskinds LLP

In Re Lamictal Direct Purchaser Antitrust Litigation

- United States District Court New Jersey
- Case No. 1 2-95 -WHW-MCA
- Expert Report, November 6, 2017
- Revised Expert Reply Report, April 16, 2018
- Testified at deposition, June 6, 2018
- Opinion concerning class certification and damages issues
- Retained by Berger & Montague, P.C.

In Re Namenda Direct Purchaser Antitrust Litigation

- United States District Court Southern District of New York
- Case No. 1:15-CV-07488
- Expert Report, September 15, 2017
- Amended Expert Report, September 20, 2017
- Expert Reply Report, October 25, 2017
- Amended Expert Reply Report November 9, 2017
- Testified at deposition, October 6, 2017
- Opinion concerning class certification and damages issues
- Retained by Berger & Montague, P.C.; and Garwin Gerstein & Fisher LLP

In Re Capacitors Antitrust Litigation

- United States District Court Northern District of California San Francisco Division
- Case No. 3:14-CV-03264 -JD
- Expert Declaration, February 24, 2017
- Expert Reply Declaration, April 28, 2017
- Testified at deposition, May 17, 2017
- Expert Trial Declaration, November 30, 2018
- Expert Trial Reply Declaration, April 19, 2019
- Testified at deposition, May 23, 2019
- Expert Declaration, July 2, 2021
- Opinion concerning class certification issues regarding indirect purchasers
- Retained by Cotchett, Pitre & McCarthy, LLP

2016 *Deere Construction, LLC, v. Cemex Construction Materials Florida, LLC, et al.*

- United States District Court Southern District of Florida
- Case No. 15-24375-CIV-ALTONAGA/O'Sullivan
- Expert Report, September 14, 2016
- Testified at deposition, September 27, 2016
- Opinion concerning class certification issues
- Retained by Kozyak Tropin & Throckmorton, LLP; Harke Clasby & Bushman, LLP; and McCallum, Methvin & Terrell, P.C.

Luke Begonja v. Wyndham Vacation Resorts, Inc., et al. (Case No. 2015-CA-010943)

Gerrit Brouwer, Jr., et al. v. Wyndham Vacation Resorts, Inc., et al. (Case No. 2014-CA-008533)

Gary Gottschalk, et al. v. Wyndham Vacation Resorts, Inc., et al. (Case No. 2015-CA-001957)

Susan Hatzipetro, et al. v. Wyndham Vacation Resorts, Inc., et al. (Case No. 2014-CA-007996)

Shelly Keegan, et al. v. Wyndham Vacation Resorts, Inc., et al. (Case No. 2015-CA-001953)

Yvonne Klebba, et al. v. Wyndham Vacation Resorts, Inc., et al. (Case No. 2014-CA-008535)

Adriane McConville, et al. v. Wyndham Vacation Resorts, Inc., et al. (Case No. 2015-CA-001960)

Ernest W. Yeager Jr., et al. v. Wyndham Vacation Resorts, Inc., et al. (Case No. 2014-CA-008054)

- In the Circuit Court of the Ninth Judicial Circuit in and for Orange County, Florida
- Expert Report, September 14, 2016
- Testified at deposition, October 27-28, 2016
- Testified at deposition, March 2-3, 2017
- Expert Report, May 19, 2017
- Testified at deposition, August 29, 2017
- Opinion concerning damages issues
- Retained by Badham & Buck, LLC

In Re: Evanston Northwestern Healthcare Corporation Antitrust Litigation

- United States District Court for the Northern District of Illinois Eastern Division
- No. 07-C-4446
- Expert Report, July 28, 2016
- Expert Reply Report, January 25, 2017
- Testified at deposition, September 20, 2016
- Testified at deposition, February 22, 2017

- Opinion concerning damages issues
- Retained by Miller Law LLC

In Re: Ductile Iron Pipe Fittings ("DIPF") Direct Purchaser Antitrust Litigation

- United States District Court for the District of New Jersey
- Civ. No. 12-711 (AET)(LHG)
- Declaration, May 27, 2016
- Reply Declaration, March 31, 2017
- Testified at deposition, July 8, 2016
- Opinion concerning class certification, merits, and damages issues
- Retained by Cohen Milstein Sellers & Toll PLLC; and Kaplan Fox & Kilsheimer LLP

Nestlé Purina Petcare Company v. Blue Buffalo Company, Ltd.

Blue Buffalo Company, Ltd. v. Nestlé Purina Petcare Company, et al.

Blue Buffalo Company, Ltd. v. Wilbur-Ellis Company, et al.

Diversified Ingredients, Inc. v. Wilbur-Ellis Company, et al.

Diversified Ingredients, Inc. v. Custom AG Commodities, LLC, et al.

- United States District Court for the Eastern District of Missouri Eastern Division
- Cause No.: 4:14-CV-00859 RWS
- Affidavit, March 17, 2016
- Opinion concerning pricing issues
- Retained by Lashly & Baer, P.C.

In Re: Cast Iron Soil Pipe and Fittings Antitrust Litigation

- United States District Court Eastern District of Tennessee at Chattanooga
- Case No.: 1:14-md-2508
- Declaration, March 4, 2016
- Testified at deposition, May 19, 2016
- Opinion concerning class certification and damages issues
- Retained by Cohen Milstein Sellers & Toll PLLC; Cera LLP; and Kaplan Fox & Kilsheimer LLP

Darren Ewert v. Denso Corporation, et al.

- Supreme Court of British Columbia
- Case No. S-135610
- Expert Report, February 12, 2016
- Expert Reply Report, January 5, 2017
- Opinion concerning class certification issues
- Retained by Camp Fiorante Matthews Mogerman

Serge Asselin v. Hitachi, LTD & al.

- Cour Supérieure Disctirct de Québec

- Case No. 200-06-000180-144
- Expert Report, February 11, 2016
- Opinion concerning class certification issues
- Retained by Siskinds LLP

2015 *Thomas Mervyn v. Atlas Van Lines, Inc., et al.*

- United States District Court Northern District of Illinois Eastern Division
- Case No. 1:13-CV-03587
- Expert Declaration, September 3, 2015
- Expert Report, February 4, 2016
- Opinion concerning data issues
- Opinion concerning damages issues
- Retained by Miller Law LLC

Thomas Mervyn v. Nelson Westerberg, Inc.

- United States District Court Northern District of Illinois Eastern Division
- Case No. 1:11-CV-06594
- Expert Report, July 27, 2015
- Opinion concerning damages issues
- Retained by Miller Law LLC

Lane's Gifts and Collectibles, LLC v. Microsoft Online, Inc.

- United States District Court Western District of Washington at Seattle
- No. 2:12-cv-01181-BJR
- Expert Report, March 23, 2015
- Testified at deposition, May 21, 2015
- Opinion concerning damages issues
- Retained by Nix, Patterson & Roach, L.L.P.; and Kessler Topaz Meltzer & Check, LLP

BlueCross BlueShield of Tennessee, Inc., et al. v. King Pharmaceuticals, Inc., et al.

- In the Circuit Court for Cocke County, Tennessee
- Civil Action No. 32941-II
- Expert Report, January 23, 2015
- Opinion concerning impact and damages issues
- Retained by Miller Law LLC

In Re: Domestic Drywall Antitrust Litigation

- United States District Court for the Eastern District of Pennsylvania
- MDL No. 2437 13-MD-2437
- Trial Expert Report, January 23, 2015
- Reply Expert Report, April 23, 2015
- Expert Report concerning class certification, August 3, 2016
- Expert Reply Report concerning class certification, January 9, 2017
- Affidavit, July 11, 2019

- Testified at deposition, February 25, 2015
- Testified at deposition, August 30, 2016
- Testified at deposition, February 17, 2017
- Testified at class certification hearing, April 27, 2017
- Expert Supplemental Report, July 31, 2017
- Opinion concerning merits issues regarding direct purchasers
- Opinion concerning class certification issues, impact and damages regarding direct purchasers
- Retained by Cohen Milstein Sellers & Toll PLLC; Berger & Montague, P.C.; and Spector Roseman Kodroff & Willis, P.C.

In Re: Processed Egg Products Antitrust Litigation

- United States District Court for the Eastern District of Pennsylvania
- MDL No. 2002
- Expert Declaration, January 22, 2015
- Expert Reply Declaration, April 3, 2015
- Testified at deposition, May 7, 2015
- Opinion concerning merits and damages issues regarding indirect purchasers
- Retained by Straus & Boies, LLP

2014 *In Re: Class 8 Transmission Indirect Purchaser Antitrust Litigation*

- United States District Court for the District of Delaware
- Civil Action No. 11-cv-00009 (SLR)
- Declaration, November 3, 2014
- Reply Declaration, March 6, 2015
- Trial Declaration, March 27, 2015
- Trial Reply Declaration, July 2, 2015
- Testified at deposition, December 17, 2014
- Testified at deposition, March 16, 2015
- Testified at class certification hearing, March 25, 2015
- Testified at deposition, May 1, 2015
- Opinion concerning class certification issues regarding indirect purchasers
- Opinion concerning merits and damages issues regarding indirect purchasers
- Retained by Glancy Binkow & Goldberg LLP

Mark S. Wallach, et al., v. Eaton Corporation, et al.

- United States District Court District of Delaware
- Civil Action No. 10-260-SLR
- Expert Report, November 3, 2014
- Expert Reply Report, March 6, 2015
- Trial Expert Report, March 27, 2015
- Trial Expert Reply Report, July 2, 2015
- Testified at deposition, December 16, 2014
- Testified at deposition, March 16, 2015

- Testified at class certification hearing, March 25, 2015
- Testified at deposition, May 1, 2015
- Opinion concerning class certification issues regarding direct purchasers
- Opinion concerning merits and damages issues regarding direct purchasers
- Retained by Cohen Milstein Sellers & Toll PLLC

Sheridan Chevrolet Cadillac Ltd., et al., v. Furukawa Electric Co. Ltd., et al.

Sheridan Chevrolet Cadillac Ltd., et al., v. Mitsubishi Electric Corporation, et al.

- Ontario Superior Court of Justice
- Court File Nos. CV-12-446737-00CP / CV-14-496994-00CP
- Expert Report, April 15, 2016
- Expert Report, October 14, 2014
- Opinion concerning class certification issues
- Retained by Siskinds LLP

Resco Products, Inc., v. Bosai Minerals Group Co., Ltd., et al.

- United States District Court for the Western District of Pennsylvania
- Civil Action No.: 2:06-cv-235-JFC
- Expert Report, September 24, 2008
- Expert Report, September 29, 2014
- Supplemental Expert Report, December 15, 2014
- Testified at deposition, February 13, 2015
- Opinion concerning damages
- Retained by Boies, Schiller & Flexner LLP

Fond Du Lac Bumper Exchange Inc., et al. v. Jui Li Enterprise Company Ltd. et al.

- United States District Court Eastern District of Wisconsin
- Case No.: 2:09-cv-00852-LA
- Affidavit, August 1, 2014
- Affidavit, November 4, 2014
- Declaration, April 24, 2015
- Expert Report, July 15, 2015
- Expert Reply Report, November 24, 2015
- Expert Surreply Report, January 15, 2016
- Expert Trial Report, August 18, 2016
- Expert Trial Reply Report, December 20, 2016
- Testified at deposition, October 1, 2015
- Testified at deposition, February 13, 2017
- Opinion concerning class certification and damages issues
- Opinion concerning Defendants' replacement data
- Opinion concerning Defendant and LKQ transaction-level data
- Opinion concerning merits and damages issues
- Retained by Stueve Siegel Hanson, LLP

Meredith Corporation, et al., v. SESAC, LLC, et al.

- United States District Court for the Southern District of New York
- 09 Civ. 9177 (PAE)
- Expert Report, July 10, 2014
- Opinion concerning class certification issues
- Retained by Weil, Gotshal & Manges LLP

Janet Skold, et al., v. Intel Corporation, et al.

- Superior Court of the State of California for the County of Santa Clara
- Case No. 1-05-CV-039231
- Expert Report, June 14, 2007
- Testified at deposition, August 31, 2007
- Testified at deposition, January 10, 2014
- Opinion concerning class certification issues
- Opinion concerning damages issues
- Retained by Girard Gibbs LLP

In Re: Polyurethane Foam Antitrust Litigation

- United States District Court Northern District of Ohio Western Division 8
- MDL No. 2196
- Declaration, June 11, 2013
- Reply Declaration, October 23, 2013
- Trial Declaration, March 18, 2014
- Reply Trial Declaration, June 30, 2014
- Testified at deposition, August 20, 2013
- Testified at deposition, November 20, 2013
- Testified at class certification hearing, January 15, 2014
- Testified at deposition, April 14, 2014
- Testified at deposition, July 14, 2014
- Opinion concerning class certification issues regarding indirect purchasers
- Opinion concerning merits and damages issues
- Retained by Miller Law LLC

Professional Experience

Economic Consulting Positions

Monument Economics Group, Oct. 11, 2016 - Present

Nathan Associates, Inc., Arlington, VA, *Senior Vice President*, Jan. 2013 – Sep. 20, 2016

Advanced Analytical Consulting Group, Inc., Washington, DC, *Principal*, Mar. 2011– Jan. 2013

Econ One Research, Inc., Washington, DC, Managing Director and DC Office Head, Jul. 2006 – Mar. 2011

- Opened and staffed the DC office; managed office affairs on a daily basis
- Retained as an expert witness for damages and class certification issues in antitrust, breach of contract, product liability and RICO cases; representative testimony includes determination of liability and damages in a case involving resale price maintenance in consumer products, class certification in a horizontal price-fixing case involving international travel in the airline industry, class certification in a consumer class action involving RICO claims in state court
- Industry pre-litigation analyses for consumer products, chemicals, and other industries

Navigant Consulting, Inc., Washington, DC, *Associate Director*, Feb. 2006 – Jul. 2006

- Case manager for damages analysis in asbestos litigation and personal injury claims

Nathan Associates, Inc., Arlington, VA, *Managing Economist*, Jul. 2004 – Feb. 2006

- Case manager for economic analysis of class certification and damages issues in antitrust and RICO cases involving the chemical, consumer products, and tobacco industries
- Retained as expert on damages for direct purchasers of NBR in the Crompton Global Settlement; submitted an Affidavit on damages and appeared before the Special Master for the Crompton Global Settlement (the Hon. Kenneth Feinberg)

Board Membership

- Board of Advisors, American Antitrust Institute, Washington, DC
- Department of Economics Advisory Council, University of Tennessee, Knoxville, Chairman, Spring 2006 – April 2011

Teaching Positions

- The University of Tennessee, Knoxville, *Adjunct Professor*, Spring 2019 – present
- The George Washington University, Washington, DC, *Adjunct Assistant Professor of Economics*, Fall 2004 – present
- North Carolina State University (NCSU), *Assistant Professor* (Department of Agricultural and Resource Economics), Fall 1999 – Spring 2004
- The University of Pennsylvania, *Adjunct Instructor*, Summer 1990 – Spring 1994

Additional Teaching Experience

- The Wharton School Evening Division, Philadelphia, PA, summer 1993
- Rutgers University, Camden, NJ, summer 1993
- Philadelphia College of Textiles and Science, Philadelphia, PA, fall 1992
- The Pennsylvania State University, Media, PA, 1991
- St. Mary's College of Maryland, St. Mary's City, MD, summer 1989

- The University of Maryland University College, College Park, MD, 1988-1989

Courses Taught

- Managerial Economics for MBA students (George Washington University)
- Law and Economics (George Washington University)
- Intermediate Microeconomics – graduate level (George Washington University)
- Latin American Economic Development (George Washington University)
- International Trade: Theory and Policy (George Washington University)
- International Finance: Theory and Policy (George Washington University)
- Agricultural Production and Supply – Ph.D. field course (North Carolina State University)
- U.S. Agricultural Policy (North Carolina State University)
- Microfinance: Theory, Practice and Regulation (Superintendencia de Banca y Seguros)
- Statistical Analysis for Economics (University of Pennsylvania)
- Principles of Microeconomics (University of Maryland, St. Mary's College of Maryland)
- Principles of Macroeconomics (University of Pennsylvania, The Wharton School, Penn State University)
- Fundamentals of Micro/Macro Economics (University of Maryland)
- Environmental and Natural Resource Economics (Rutgers)

Federal Reserve Experience

Federal Reserve Bank of Kansas City, *Senior Economist* Jan. 1998 – Aug. 1999; *Economist*, Jan. – Dec. 1997

- Analysis of regional, macroeconomic developments in agriculture, and energy
- Research on public policy towards agriculture in the U.S., especially the impact of farm policy reform
- Briefings to the Bank president and outside groups on the regional economy, agriculture, agricultural trade

Board of Governors of the Federal Reserve System, *Economist*, Jun. 1994 – Dec. 1996

- Analysis of macroeconomic conditions, commodity markets, and prices (CPI, PPI, Core prices)
- Forecasting of agricultural output, prices, and income
- Briefings to the Board of Governors on agriculture and food-price developments

Other Consulting Experience

World Perspectives, Inc., 2003 - 2004

- Analysis of trade barriers for U.S. exports of feed ingredients, pet food ingredients, and food ingredients
- Analysis of the impact of a Free Trade Area of the Americas on U. S. soybean producers
- Analysis of the potential for U.S. Halal-certified meat exports to the Middle East

Womble Carlyle Sandridge & Rice, LLP, 2003 - 2004

- Provided expert testimony related to the estimation of business profitability Smith-Moore, 2002 - 2003
- Provided economic analysis of the U.S. Tobacco Program

Superintendencia de Banca y Seguros (Lima, Peru), 1998 - 2000

- Developed and taught a class on Microfinance issues (in English) to students enrolled in a training program for bank examiners; the program was sponsored by the Inter-American Development Bank.

World Bank, Africa Technical Department, 1992 – 1993

- Summarized and provided an overview of data available on African economic and social indicators

ACG-Afrique, January 1993

- Provided critical review of a study document outlining the impact of structural adjustment on African agriculture

Professional Organizations

- National Association for Business Economics
- American Economic Association

Papers, Publications, and Speeches

Papers Published in Refereed Journals

- "Losing the Forest for the Trees: On the Loss of Economic Efficiency and Equity in Federal Price-Fixing Class Actions," (with Martin A. Asher and Gregory K. Arenson) *Virginia Law & Business Review*, Vol. 16, No. 2, Spring 2022, 293-325
- "Government Regulation and Quality in the U.S. Beef Market," (with Peyton Ferrier) *Food Policy*, Vol. 32, No. 1, February 2007, 84-97
- "Rent-seeking in U.S.-Mexican Avocado Trade," *Cato Journal*, Vol. 26, No. 1, December 2006, 159-177

- "Consolidation in U.S. Agriculture and the Role of Public Policy," *The ICFAI Journal of Agricultural Economics,* Vol. 1, 2004, 7-16
- "Fertilizer Use, Risk, and Off-farm Labor Markets in the Semi-Arid Tropics of India," *American Journal of Agricultural Economics,* Vol. 85, No. 2, May 2003, 359-371
- "Inverse Productivity: Land Quality, Labor Markets, and Measurement Error," *Journal of Development Economics,* Vol. 71, No. 1, June 2003, 71-95
- "A Market-Forces Policy for the New Farm Economy?" *Review of Agricultural Economics,* Vol. 24, No. 1, 1 March 2002, 15-30
- "Food Crops, Exports, and the Short-run Policy Response of Agriculture in Africa," *Agricultural Economics,* Vol. 22, No. 3, April 2000, 271-298
- "FAIR Act Implications for Land Values in the Corn Belt," (with Jason Henderson) *Review of Agricultural Economics,* Vol. 22, No. 1, Summer – Spring 2000, 102-119
- "Why are Estimates of Agricultural Supply Response So Variable?" (with Francis X. Diebold) *Journal of Econometrics,* Vol. 76, No. 1-2, January – February 1997, 367-373

Non-refereed Publications, Articles, and Editorials

- "The Predominance Requirement for Antitrust Class Actions – Can Relevant Market Analysis Help?" (with Jeffrey Leitzinger) American Bar Association – Section of Antitrust Law, *Economics Committee Newsletter*, Vol. 7, No. 1, Spring 2007, 17-22
- "Reform of U.S. Farm Policy in an Integrating World Economy," *Developing Countries in the WTO System*, 2006
- "New Farm Economy," *Regulation*, Winter 2003-2004, Cato Institute for Public Policy Research, 2003
- "What Road Will U.S. Economy Take in 2003?" *Southeast Farm Press*, 5 February 2003
- "Fast Track for the Tax Cuts," guest editorial, *News and Observer*, 18 January 2003
- "The 2002 Farm Bill," (with Blake Brown and Michele Marra) *NC State Economist,* November – December 2002
- "Economy-minded Tax Cuts: Bush's Reductions Provided the Boost to Lift U.S. From Recession," guest editorial, *News and Observer*, 2 July 2002
- "Policy Only Effective if Farm Economy is Recognized," special report to *Feedstuffs*, 5 June 2000
- "Aid During Crisis of Little Long-term Help to Farmers," guest editorial, *Kansas City Star,* 23 August 1999
- "Survey of Agricultural Credit Conditions," Federal Reserve Bank of Kansas City," *Regional Economic Digest*, various issues, 1997-1999
- "U.S. Agriculture at the Crossroads in 1999," *Economic Review,* Federal Reserve Bank of Kansas City, Vol. 84, No. 1, 1999, 73-91

- "Can U.S. Oil Production Survive the 20th Century?" *Economic Review,* Federal Reserve Bank of Kansas City, Vol. 84, Quarter I, 1999
- "Will the Tenth District Catch the Asian Flu?" (with Ricardo Gazel) *Economic Review,* Federal Reserve Bank of Kansas City, Vol. 83, Quarter II, 1998, 9-26
- "From the Plains to the Plate: Can the Beef Industry Regain Market Share?" (with Michelle Beshear) *Economic Review,* Federal Reserve Bank of Kansas City, Vol. 83, Quarter IV, 1998, 49-66
- "U.S. Agriculture: Another Solid Year in 1998?" (with Mark Drabenstott) *Economic Review,* Federal Reserve Bank of Kansas City, Vol. 83, No. 1, Quarter I, 1998, 55-74
- "How Will the 1996 Farm Bill Affect the Outlook for District Farmland Values?" *Economic Review,* Federal Reserve Bank of Kansas City, Vol. 82, Quarter IV, 1997, 85-101
- "Food Prices and the Farm Sector," monthly *Greenbook*, Federal Reserve Board of Governors, various issues 1994-1996
- "Hedge to Arrive Contracts," Memo to the Board of Governors, Federal Reserve Board of Governors, 5 June 1996
- "Prices in the May Greenbook," Federal Reserve Board of Governors, 19 May 1996
- "Prices in the March Greenbook," Federal Reserve Board of Governors, 24 March 1996
- "Commodity Price Developments," Weekly memo to the Board of Governors, Federal Reserve Board of Governors, August 1994 – December 1996

Conference Presentations

- "Class Action Developments," panelist at the American Antitrust Institute's 6th Annual Private Antitrust Enforcement Conference, Washington, DC: 4 December 2012
- "Consequences for Antitrust Thought and Practice," presented at the American Antitrust Institute Invitational Symposium: Antitrust Challenge of Multi-Channel Distribution in the Internet Age, Washington, DC: 22 June 2011
- "The U.S. Economy in the Year Ahead," presented at the Long Company Annual Conference, Chicago, IL: 11 September 2009 and 19 September 2008
- "The U.S. Economic Outlook," presented at the Industry Outlook Conference, Chicago, IL: 17 October 2006 and 18 October 2005
- "How Will the Economy Impact Your Business?" presented at the Long Company Annual Conference, Las Vegas, NV: 14 August 2004
- "Focus on The Economy" presented at *Milling and Baking News* Annual Purchasing Managers' Conference, Kansas City, MO: 14 June 2004, 10 June 2003 and 11 June 2002

- "The U.S. Economic Outlook and Agriculture," presented at the Industry Outlook Conference, Chicago, IL: October 2003
- "The U.S. Economic Outlook and Agriculture," presented at the Industry Outlook Conference, Breckenridge, CO: 7 April 2002
- "The U.S. Economic Outlook: The Cost of Terror," presented at the Southern Agricultural Outlook Conference, Atlanta, GA: 24 September 2001
- "The Economy in Focus," presented at *Milling and Baking News* annual purchasing managers' conference, Kansas City, MO: 5 June 2001
- "The Great American Growth Machine," presented at the Southern Agricultural Outlook Conference, Atlanta, GA: 27 September 2000
- "The Economy in Focus," presented at *Milling and Baking News* annual purchasing managers' conference, Kansas City, MO: 6 June 2000
- "The Outlook for the U.S. Pork Sector," presented to the Industry Outlook Conference, Las Vegas, NV: 17 April 2000
- "The National Economic Outlook: The Road Ahead," presented to the Food Industry Outlook Conference, Breckenridge, CO: 11 April 1999
- "Farm Policy for the New Millennium," presented to Federal Reserve Bank of Kansas City, Division of Bank Supervision and Regulation, Bank Examiners' Annual Training Conference, 7 January 1999
- "The Impact of the 1996 Farm Bill on Farmland Values," (with Jason Henderson) first place poster presentation at the annual meetings of the American Agricultural Economics Association, Salt Lake City, UT: 4 August 1998
- "A Note on the Inverse Productivity Relationship," presented at the annual meetings of the Western Economic Association International, Seattle, WA: July 1997
- "Off-farm Labor Supply and Fertilizer Use in the Semi-Arid Tropics of India," presented at the annual meetings of the American Agricultural Economics Association, August 1995
- "Prices for Food-Away-From-Home and Core Inflation: Some Empirical Relationships," (with James E. Kennedy) presented at the Federal Reserve System Committee on Agriculture, Richmond, VA: October 1995
- "Some Simple Dynamics of Farming," presented at the annual meetings of the American Agricultural Economics Association, Orlando, FL: August 1993
- "Structural Adjustment and Food Security," (with W. Graeme Donovan), presented at the annual meetings of the American Agricultural Economics Association, Orlando, FL: August 1993
- "Structural Adjustment and African Agricultural Supply Response to Exchange Rate and Price Movements," (with W. Graeme Donovan), presented at the annual meetings of the Southern Agricultural Economics Association, Tulsa, OK: January 1993

Other Presentations

- Panelist, "Injured V. Non-Injured In Class Actions," American Bar Association, 18 October 2022
- Panelist, "If I Am Uninjured, Do I Not Bleed? The Packaged Seafood Decision," American Bar Association Webinar, 22 June 2022
- Panelist, "Antitrust Class Actions – Where Are We? A 360 Degree Perspective," NYSBA Annual Antitrust Law Section Meeting," 30 January 2014
- Panelist, Retrospective on the Baby Products Litigation, ABA Section of Antitrust Law: Pricing Conduct Committee, 31 July 2013
- Panelist, Economic Forecasting Summit, Northern Indiana Workforce Investment Board, Inc., 29 March 2007
- "The Welfare Benefits of USDA Beef Quality Certification Programs" (with Peyton Ferrier), presentation memo, 2007
- "Reform of U.S. Farm Policy in an Integrating World Economy," presented to the Cordell Hull Institute, Trade Policy Roundtable on Reform of U.S. Farm Policy and the WTO System, Washington, DC: 31 March 2006
- "The Case for a Market-forces Farm Policy in the U.S." presented at the Cordell Hull Institute Trade Policy Roundtable, Washington DC: 26 May 2005
- "How Will the Economy Impact Your Business?" presented at the Apple Processors Association annual meeting, Homewood Resort, 20 June 2004
- "The U.S. and International Economic Outlook," presented at the AgFirst Loan Officer's Seminar, Atlanta, GA: 30-31 October 2002
- "Will the U.S. Economy Bounce or Crawl?" presented to the Eastern Bankruptcy Institute, North Myrtle Beach, SC: 1 June 2002
- "The U.S. Economic Outlook and Agriculture," presented to the National Pork Producers Pork Action Group, Washington, DC: 10 April 2002
- "The U.S. Economic Outlook" presented to the Risk Management Associates, Raleigh, NC: 7 February 2002
- "The U.S. Economic Outlook: The Cost of Terror," presented at the National Pork Producers Pork Action Group, Marco Island, FL: 14 November 2001
- "Consolidation in Agriculture and the Role of Public Policy," paper presented to the Southern Extension Meetings, Williamsburg, VA: 13 June 2000
- "The New Farm Economy," presented at the annual meetings of the National Association of County Agricultural Agents, Omaha, NE: 14 September 1999
- "Regional Economic Update," presented to bankers in Kansas, Nebraska, Missouri, and Oklahoma as part of the Regulatory Update Seminar, Federal Reserve Bank of Kansas City, April 1999

- "The National Economic Outlook," presented to Oklahoma State University Advanced Cattle Management Seminar, Stillwater, OK: 11 March 1999
- "Regional Economic Update," presented to Thomas Hoenig, President, Federal Reserve Bank of Kansas City, 13 November 1998
- "Can the Tenth District Survive the Asian Flu?" The Federal Reserve Bank of Kansas City Economic Forums, nine presentations to bankers in Wyoming, Oklahoma, and New Mexico, 21 September – 21 October 1998
- "The Impact of Asian Economic Developments on Tenth District Agriculture," presented to Thomas Hoenig, President, Federal Reserve Bank of Kansas City, 30 January 1998
- "The Outlook for the Nebraska Economy," The Federal Reserve Bank of Kansas City: Nebraska Economic Forums, six presentations to bankers in Nebraska, 6-15 October 1997
- "Update on the Macroeconomy and Special Briefing on Forecast Performance at the Kansas City Fed," presented to Thomas Hoenig, President, Federal Reserve Bank of Kansas City, 13 August 1997
- "Regional Economic Update," presented to Thomas Hoenig, President, Federal Reserve Bank of Kansas City, 14 May 1997 and 21 March 1997
- "Producer Prices, Retail Sales, and Agricultural Commodity Markets," presented to the Board of Governors of the Federal Reserve System, 15 July 1996

Referee Experience

Referee for the Following Academic Journals

- World Development, 1993
- Journal of Development Economics, 1994, 1995
- International Economic Review, 1995
- Journal of Human Resources, 1997
- Journal of Business and Economics Statistics, 1997
- American Journal of Agricultural Economics, 1999, 2001, 2002
- Agricultural Economics, 2000, 2001, 2004
- Agricultural Finance Review, 2000, 2004
- Review of Agricultural Economics, 2000, 2002, 2004
- Journal of Agricultural and Resource Economics, 2000, 2001, 2002
- Emerging Markets Review, 2001
- Contemporary Economic Policy, 2004

Fellowships, Honors, and Awards

Fellowships

- Departmental Fellowship, University of Pennsylvania, 1989-1990
- Dean's Fellowship, University of Pennsylvania, 1991-1992
- Graduate School Fellowship, University of Maryland, College Park, 1987-1989

Honor Societies and Professional Organizations

- Phi Eta Sigma National Honor Society
- Mortar Board National Honor Society
- Golden Key National Honor Society
- Vice President for Professional Activities, Delta Sigma Pi

Awards

- Top Graduate in Liberal Arts, University of Tennessee, Knoxville, Spring 1987
- Chancellor's Citation for Extraordinary Professional Promise, University of Tennessee, Knoxville
- Chancellor's Citation for Outstanding Academic Achievement, University of Tennessee, Knoxville
- First place poster presentation, American Agricultural Economics Association annual meetings, August 1998 (with Jason Henderson)
- Honorable mention, American Agricultural Economics Association, Essay for the 21st Century, 2001, "A Market Forces Policy for the New Farm Economy"
- Honorable mention, American Antitrust Institute Antitrust Enforcement Awards, Outstanding Antitrust Litigation Achievement in Economics (for work in *In Re Titanium Dioxide Antitrust Litigation*)
- American Antitrust Institute Antitrust Enforcement Awards, Outstanding Antitrust Litigation Achievement in Economics (for work in *In Re Domestic Drywall Antitrust Litigation*)
- American Antitrust Institute Antitrust Enforcement Awards, Outstanding Antitrust Litigation Achievement in Economics (for work in *In Re Namenda Direct Purchaser Antitrust Litigation*)

External Funding

- "Unmanufactured Flue-Cured Tobacco Exports and the Export Component of the Quota Formula." $13,890 NC Tobacco Foundation. With Blake Brown 2000 – 2001.

Professional Activities and Services

Graduate Student Advising

M.A. degree, North Carolina State University

- Joe Weinberg (Political Science)

Master of Economics, North Carolina State University

- William Pole (2000)
- Dwight Wilder (Chairman, 2002)
- Adrian Atkeson (2002)
- Sarah Spivey
- Li Zhang (Chairman, 2003)
- Nia Atmadja (2003)

Doctor of Philosophy, North Carolina State University

- William Deese (2003)
- Peyton Ferrier (Chairman, 2004)
- Yang Wang (2003)
- Bobby Huggett (2003)
- Syed Wadood (Chairman, 2004)
- Henry Kuo

Economic and Statistical Modeling Skills

- Experience with all major statistical software including SAS, STATA, LIMDEP and C++; applied econometric modeling skills in damage analysis of consumer industries, chemicals industries, and agricultural markets, correlation analysis for class certification.

Appendix B

Materials Relied Upon

Pleadings and Legal Correspondence

U.S. Supreme Court, *Jefferson Parish Hospital District No. 2 et al. v. Hyde*, 466 U.S., No. 82-1031, March 27, 1984.

United States District Court for the Northern District of Florida, *Restore Robotics LLC and Restore Robotics Repair LLC v. Intuitive Surgical, Inc.,* No, 5:19-cv-00055-MCR-MJF, First Amended Complaint, May 13, 2019.

United States District Court Northern District of California, *Surgical Instrument Service Company, Inc., Plaintiff, v. Intuitive Surgical, Inc.,* Defendant, Case No.: 5:21-cv-03496, Complaint, May 10, 2021.

Deposition Transcripts and Exhibits

30(b)(6) Deposition of Bob DeSantis, May 27, 2021.

30(b)(6) Deposition of Glen Papit, June 2, 2021.

30(b)(6) Deposition of Greg Posdal, November 1, 2022.

30(b)(6) Deposition of Keith Robert Johnson, October 27, 2022.

30(b)(6) Deposition of Marshall Mohr, November 7, 2022.

Individual & 30(b)(6) Deposition of Nicky Goodson, October 27, 2022.

Deposition of Anthony McGrogan, June 7, 2021.

Deposition of Antonio (AJ) Inacay, June 8, 2021.

Deposition of Bob Overmars, June 15, 2021.

Deposition of Chris Gibson, June 22, 2021.

Deposition of Dan Jones, November 10, 2022.

Deposition of David Mixner, June 10, 2021.

Deposition of Edward W. Harrich, May 24, 2021.

Deposition of Glenn Vavoso, May 14, 2021.

Deposition of Grant Duque, November 8, 2022.

Deposition of Greg Posdal, May 10, 2021.

Deposition of Katie Scoville, May 26, 2021.

Deposition of Myriam Curet, MD, May 7, 2021.

Deposition of Ronald Lee Bair, Jr., May 24, 2021.

Deposition of Stacey Donovan, May 27, 2021.

Deposition of Tyler McDonald, May 7, 2021.

Bates-Stamped Materials

Documents

Intuitive-00001237	Intuitive-00110473	Intuitive-00366044
Intuitive-00011487	Intuitive-00113020	Intuitive-00372699
Intuitive-00014395	Intuitive-00121229	Intuitive-00552993
Intuitive-00029346	Intuitive-00124485	Intuitive-00594883
Intuitive-00049108	Intuitive-00133628	Intuitive-00595405
Intuitive-00073538	Intuitive-00139149	Intuitive-00595673
Intuitive-00091257	Intuitive-00141567	Intuitive-00601672
Intuitive-00102938	Intuitive-00173706	Intuitive-00602576
Intuitive-00103456	Intuitive-00194074	Intuitive-00604054
Intuitive-00106127	Intuitive-00234762	Intuitive-00604123
Intuitive-00110252	Intuitive-00292544	Intuitive-00604127
Intuitive-00110451	Intuitive-00364420	Intuitive-00686068

Third-Party Materials

Academic Literature

A.P. Lerner, "The Concept of Monopoly and the Measurement of Monopoly Power," *The Review of Economic Studies*, Vol. 1, No.3, 1934, 157-175.

Abhishek Trehan and Tristan J. Dunn, "The robotic surgery monopoly is a poor deal," *The BMJ*, Vol. 347, December 19, 2013, 1-2.

Andrew Brodie and Nikhil Vasdev, "The future of robotic surgery: How robotics could help shape the future of surgical care," *Annals of the Royal College of Surgeons of England*, September 4, 2018.

Anthony R. Lanfranco, BAS, Andres E. Castellanos, MD, Jaydev P. Desai, PhD, and William C. Meyers, MD, "Robotic Surgery: A Current Perspective," *Annals of Surgery*, Vol. 239, No. 1, January 2004, 14-21.

Dennis Carlton and Jeffrey Perloff, *Modern Industrial Organization*. Fourth Edition Global, Reading, MA: Addison Wesley, 2015.

Herbert Hovenkamp, *The Antitrust Enterprise*, Cambridge, MA: Harvard University Press, 2005.

Ioannis D. Gkegkes, Ioannis A. Mamais, and Christos Iavazzo, "Robotics in general surgery: A systematic cost assessment." *Journal of Minimal Access Surgery*, Vol. 13, No. 4, 2017, 243-255.

Jaydeep H Palep, "Robotic assisted minimally invasive surgery," *Journal of Minimal Access Surgery*, Vol.5, No.1, January-March 2009, 1-7.

Jonathan E. Duchac, James M. Reeve, and Carl S. Warren, *Financial and Managerial Accounting,* Twelfth Edition, Mason, OH: South-Western Cengage Learning, 2014.

Jusuf Jamal, Abdulrahman M. Alshahrani, Jamal M. Arif, Feras M. Almarshad, "Robots in Cancer Surgery: A Boon or Bane," *Journal of Cancer Therapy*, Vol. 11, No. 12, December 2020, 803-823.

Katherine Levinson, "Robotic Assisted Surgery," *Electrical and Computer Engineering Design Handbook*, 2015.

Mahdi Azizian, May Liu, Iman Khalaji, and Simon DiMaio, "Chapter 1: The Da Vinci Surgical System," *The Encyclopedia of Medical Robotics*, Vol. 1, October 2018, 3-28.

Nicholas Economides, "Tying, bundling, and loyalty/requirement rebates," *Research Handbook on the Economics of Antitrust Law*, Einer Elhauge (Ed.), Edward Elgar, 2012, 121-143.

Pradeep P. Rao, "Robotic surgery: new robots and finally some real competition!," *World Journal of Urology*, Vol. 36, No. 4, April 2018, 537-541.

Rafael E. Perez and Steven D. Schwaitzberg, "Robotic surgery: finding a value in 2019 and beyond," *Annals of Laparoscopic and Endoscopic Surgery,* Vol. 4., May 30, 2019.

Richard A. Posner, *Antitrust Law*. Second Edition, Chicago, IL: The University of Chicago Press, 2001.

Robert S. Pindyck and Daniel L. Rubinfield, *Microeconomics*, Eighth Edition, Upper Saddle River, New Jersey: Pearson Education, 2013.

Sally Kathryn Longmore, Ganesh Naik, and Gaetano D. Gargiulo, "Laparoscopic Robotic Surgery: Current Perspective and Future Directions," *Robotics*, Vol. 2, No. 9, 2020.

Tim Lane, "A short history of robotic surgery," *Annals of the Royal College of Surgeons of England*, 2018.

William E. Kelley, "The Evolution of Laparoscopy and the Revolution in Surgery in the Decade of the 1990s," *Journal of The Society of Laparoscopic & Robotic Surgery*, 2008, 351-357.

Zheng Wang, Sicong Liu, Jing Peng, and Michael Zhiqiang Chen, "The Next-Generation Surgical Robots," *Intech Open*, 2017, 3-21.

SEC Filings

Asensus Surgical, Inc., SEC Form 10-K, filed on March 11, 2021.

Intuitive Surgical, Inc., SEC Form 10-K, filed March 16, 2005.

Intuitive Surgical, Inc., SEC Form 10-K, filed March 15, 2006.

Intuitive Surgical, Inc., SEC Form 10-K, filed January 29, 2010.

Intuitive Surgical, Inc., SEC Form 10-K, filed February 1, 2011.

Intuitive Surgical, Inc., SEC Form 10-K, filed February 6, 2012.

Intuitive Surgical, Inc., SEC Form 10-K, filed February 4, 2013.

Intuitive Surgical, Inc., SEC Form 10-K, filed February 3, 2014.

Intuitive Surgical, Inc., SEC Form 10-K, filed February 2, 2016.

Intuitive Surgical, Inc., SEC Form 10-K, filed February 6, 2017.

Intuitive Surgical, Inc., SEC Form 10-K, filed February 2, 2018.

Intuitive Surgical, Inc., SEC Form 10-K, filed February 7, 2020.

Intuitive Surgical, Inc., SEC Form 10-K, filed February 10, 2021.

Intuitive Surgical, Inc., SEC Form 10-K, filed February 3, 2022.

Intuitive Surgical, Inc., SEC Form 10-Q, filed October 21, 2022.

TransEnterix Inc., SEC Form 10-K, filed on March 18, 2018.

TransEnterix Inc., SEC Form 10-K, filed on February 27, 2019.

Correspondence

Telephone conversation with Mr. Philip J. Phillips, dated December 1, 2022.

Press Release

"TransEnterix Announces Name Change to Asensus Surgical and Introduces a New Category of Surgery, Performance-Guided Surgery," *Business Wire*, February 23, 2021. Available at: https://www.businesswire.com/news/home/20210223005444/en/TransEnterix-Announces-

Name-Change-to-Asensus-Surgical-and-Introduces-a-New-Category-of-Surgery-Performance-Guided-Surgery.

Government Agency Publications

FDA, "FDA's Role in Regulating Medical Devices." Available at: https://www.fda.gov/medical-devices/home-use-devices/fdas-role-regulating-medical-devices.

FDA, "What We Do." Available at: https://www.fda.gov/about-fda/what-we-do.

FDA, Letter to Iconocore Health, "RE: K210478," dated November 15, 2022. Available at https://www.accessdata.fda.gov/cdrh_docs/pdf21/K210478.pdf.

U.S. Department of Justice and the Federal Trade Commission, "Horizontal Merger Guidelines," August 19, 2010.

United States Department of Justice, Competition and Monopoly: Single-Firm Conduct Under Section 2 of the Sherman Act, 2008.

Industry Research and Company Materials

Candi Helseth, "Technology Widens Care Options for Rural Hospitals," *The Rural Monitor*, February 12, 2014.

Daren Fonda, "Intuitive Surgical Faces New Competition and FDA Concerns," *Barrons*, March 18, 2019. Available at: https://www.barrons.com/articles/intuitive-surgical-faces-new-competition-and-fda-concerns-51552903200.

Enlightened Capital, "Intuitive Surgical (SRG) Investment Analysis," December 10, 2020. Available at: https://enlightenedcapital.substack.com/p/intuitive-surgical-isrg-investment?utm_source=profile&utm_medium=reader2.

Intuitive Surgical, "da Vinci Xi/X Instrument & Accessory Catalog," January 2019. Available at: https://www.intuitive.com/en-us/-/Media/ISI/Intuitive/pdf/davinci-x-xi-instrument-accessory-us-catalog-1052082.pdf.

Intuitive Surgical, "About da Vinci Systems." Available at: https://www.davincisurgery.com/da-vinci-systems/about-da-vinci-systems.

Intuitive Surgical, "da Vinci SP." Available at: https://www.intuitive.com/en-us/products-and-services/da-vinci/systems/sp.

Intuitive Surgical, "EndoWrist/Single-Site Instrument & Accessory Catalog," May 2014. Available at: https://www.intuitivesurgical.com/products/871145_Instrument_Accessory_%20Catalog.pdf.

Intuitive Surgical, "Intuitive for Patients." Available at: https://www.intuitive.com/en-us/patients/patients.

Intuitive Surgical, "Move Surgery Forward. Again. da Vinci SP." Available at: https://www.intuitive.com/en-us/products-and-services/da-vinci/systems/sp.

Intuitive, "Patent Notice." Available at: https://www.intuitive.com/en-us/about-us/company/legal/patent-notice.

Isaac Ro, Veronika Dubajova, CFA, Akinori Ueda, Ph. D., Ziyi Chen, Jack O'Connell, Sara Silverman, and Frits Jonker, "Digital Health: Robotic Surgery and the OR of the Future," *Goldman Sachs: Equity Research*, November 15, 2018, 1-16.

Jack Curran, "Medical Equipment Repair & Maintenance Services," *IBISWorld*, June 2020.

Jason McGorman, "Intuitive Surgical Research," *Bloomberg Intelligence*, April 2019.

Marcel Oomen, "Record High Growth in Surgical Procedures Triggers Upgrade of Guidance," *Financiële Diensten Amsterdam*, October 18, 2019, 1-4.

Marion Webb, "Market Intel: Medtech Giants Read to Battle Frontrunner Intuitive Surgical in 'Soft Surgery Robotics,'" *Pharma Intelligence*, April 2020.

The Business Research Company, "Robotic Surgery Devices Global Market Report 2022 – By Product And Service (Robotic Systems, Instruments & Accessories, Services), By Surgery Type (Urological Surgery, Gynecological Surgery, Orthopedic Surgery, Neurosurgery, Other Surgery Types), By End User (Hospitals, Ambulatory Surgery Centers) – Market Size, Trends, And Global Forecast 2022-2026," October 2022. Available at: https://www.thebusinessresearchcompany.com/report/robotic-surgery-devices-global-market-report.

News Articles

Conor Hale, "Medtronic's Hugo surgical robot collects green lights in Europe, Canada, Japan," *Fierce Biotech*, October 19, 2022. Available at: https://www.fiercebiotech.com/medtech/medtronics-hugo-surgical-robot-collects-green-lights-europe-canada-japan.

Elizabeth Cairns, "Intuitive faces down the competition," Evaluate Vantage, February 22, 2022. Available at: https://www.evaluate.com/vantage/articles/interviews/intuitive-faces-down-competition.

Jaimy Lee, "Surgical-Robot Costs Put Small Hospitals in a Bind," *Modern Healthcare*, April 19, 2014. Available at: https://www.modernhealthcare.com/article/20140419/MAGAZINE/304199985/surgical-robot-costs-put-small-hospitals-in-a-bind.

Websites

Abex Eccelencia Robotica, "Da Vinci Robotic System." Available at: https://www.abexsl.es/en/da-vinci-robotic-system/what-is-it.

Andrew Gonzalez, M.D., J.D., MPH and Anna Giorgi, "Laparoscopy," *Healthline*, October 6, 2018. Available at: https://www.healthline.com/health/laparoscopy.

BPI Medical, "About Us." Available at: https://www.bpimedical.com/about-us/.

Dr. Ivan De Backer, "Dissecting the Robotic Surgery Market," *IDTechEx*, March 30, 2020. Available at: https://www.idtechex.com/en/research-article/dissecting-the-robotic-surgery-market/20232.

Eve Cunningham, MD, MBA, "Op-Ed: Addressing Our Da Vinci Addiction – A call to action for everyone in healthcare," *MedPage Today*, October 17, 2020. Available at: https://www.medpagetoday.com/surgery/generalsurgery/89175.

John Hopkins Medicine, "Methods of Surgery." Available at: https://www.hopkinsmedicine.org/health/treatment-tests-and-therapies/methods-of-surgery.

Johnson Memorial Health, "Recovery Benefits of Laparoscopic Surgery," August 2015. Available at: http://blog.johnsonmemorial.org/recovery-benefits-of-laparoscopic-surgery.

MedStar Health, "Robotic Surgery." Available at: https://www.medstarhealth.org/services/robotic-surgery.

Midlands Clinic, "General Laparoscopic Procedures." Available at: https://midlandsclinic.com/general-laparoscopic-procedures/.

MUSC Health, "Introduction to Laparoscopic Surgery." Available at: https://muschealth.org/medical-services/ddc/patients/gi-surgery/laparoscopic-surgery/introduction.

National Health Service, "Laparoscopy (keyhole surgery)." Available at: https://www.nhs.uk/conditions/laparoscopy/.

Riccardo Autorino, MD, PhD, FEBU, "Robotic Surgical Systems in Urology: What's in the Pipeline?," *Grand Rounds in Urology*, February 7, 2018. Available at: https://grandroundsinurology.com/robotic-surgical-systems-in-urology/.

Rob Surgical, "Top 5 Trends in the Robotic Surgery Market." Available at: https://www.robsurgical.com/market-trends/.

SofMedica, "DaVinci Surgical System." Available at: https://sofmedica.com/our-portofolio/robotic-surgery/.

Stanford Health Care, "General Surgery Types." Available at: https://stanfordhealthcare.org/medical-treatments/g/general-surgery/types.html.

UC Health, "About the daVinci Surgical System." Available at: https://www.uchealth.com/services/robotic-surgery/patient-information/davinci-surgical-system/.

UCLA Health, "About Robotic Surgery at UCLA." Available at:
https://www.uclahealth.org/robotic-surgery/what-is-robotic-surgery.